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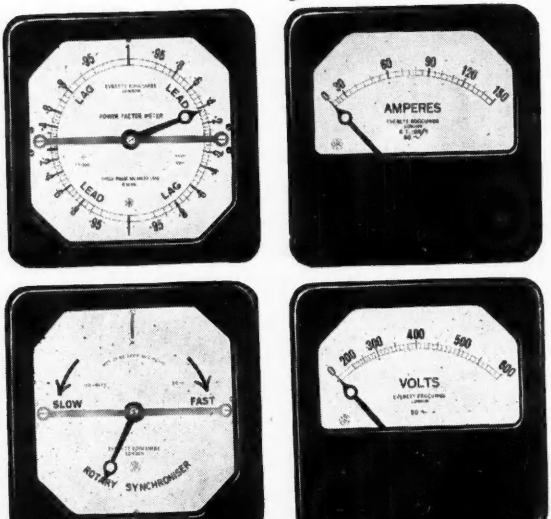

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ELECTRICAL REVIEW

Vol. CXLVII No. 3795 18TH AUGUST, 1950

THE OLDEST ELECTRICAL PAPER • ESTABLISHED 1872

European Electricity Supply

POSSIBILITIES OF INTERNATIONAL CONNECTION

IT is just a year since the Council of Europe met for the first time. The second session commenced in Strasbourg last week. The two component parts of this new type of body are a Committee of Ministers for Foreign Affairs and a Consultative Assembly, but the relationships between them are not yet very clear.

The Assembly does not conform either to parliamentary or to international conference models; its members represent Parliaments rather than Governments; it has neither legislative nor financial powers and its resolutions are no more than recommendations which the Committee may accept or reject, so what it can do does not appear to be any more definite than what it cannot.

Electricity and Schuman Plan

However, one of the main subjects which the full Assembly will seemingly need to consider this year is the Schuman plan—with major political and economic implications—for pooling the coal-mining and steel-making resources of France and Western Germany. This proposal of the Foreign Minister of France may incidentally render advisable (if not necessitate) some "alignment" of the power sources in the areas most directly concerned; but a definite explanation has not yet been offered of the way in which the scheme is intended to work. To seek approval in principle of a plan "for a purpose to be revealed hereafter" is rather putting the cart before the horse.

British opinion is that a United States of Europe cannot be created until the necessary unity actually exists. Such concord can only come about slowly, step by step, in much the same way as a European power grid will probably develop gradually, link by link, perhaps furthering that oneness of purpose which, in due course, may unite Continental countries.

System of Control

Some international control of the operation of national generating plant would be necessary, but it need not involve essential issues, such as the surrender of vital sovereign rights, which is the fundamental difference between the British and French points of view.

The function of the grand grid would largely be interconnection, leaving most countries with sufficient generating plant to satisfy their individual requirements. This would be more in accord with views expressed in Italy (referred to on another page) and also with the object of the Union of Electricity Producers of Western Europe, approved by the O.E.E.C., which is to pool (small proportions initially, but capable of being added to voluntarily) the electricity produced in power stations built with Marshall Aid.

This thirty-year treaty plan would establish a Board, composed of represen-

tatives of Governments joining the Union, to allocate supplies of electricity, fix prices and advise, but not order, the provision of new stations and power lines as and where they may be needed. The electricity production problems of Western Europe are more acute than those of the British Isles. European interconnection, part of which already exists, may develop further in the reasonably near future. If it should do so, integration of the British thermal system with the Continental thermal-hydro system by a cross-channel undersea link might be politically acceptable, provided it could be shown to be economically advantageous.

B.A. AT BIRMINGHAM

Some details are given in this issue of the meeting in Birmingham (from 30th August to 6th September) of the British Association of the Advancement of Science. The electrical side of the proceedings of the Engineering Section is not predominant; there are papers on generation by gas turbines, automatic control systems and the need for clearer circuit diagrams. The last forms part of a joint discussion on the presentation of technical information to be opened by Professor R. O. Kapp. A session on production engineering should serve a useful purpose, particularly as Mr. J. J. Gracie (G.E.C.) is participating. Five papers will be read in the Mathematics & Physics Section on high energy particles and machines for their acceleration. On the popular side, Dr. P. Dunsheath will give two lectures to juvenile audiences on "The Romance of Electricity" and there will be an exhibition illustrating "Energy in the Service of Man," in which the B.E.A. is to participate.

SOUTH AFRICAN COMMISSION

As a past and potential large buyer of British equipment (although purchases are limited by present restrictions) the South African Electricity Supply Commission is of special interest to this country. Its operations are in some respects akin to those of the British Electricity Authority in that its regional undertakings are administered as separate entities. Also, it is engaged on an impressively large programme of power station construction. Plant actually in course of erection or on order will add 702 MW to the present total of 1,486 MW, while capital expenditure during the next few years, allowing for to-day's higher costs, will more than double the figure of £50 million at the end of last year. One respect in which there is no similarity with this country is the price of fuel. At Klip, which produces more than a third of the total output, coal costs only 4s 7d a short ton.

APPRENTICE ELECTRICIANS

At a conference on the education of the young worker in industry at Oxford this week under the presidency of the Earl of Verulam, a Ministry of Labour representative mentioned electrical wiring and contracting as one of the industries attracting young workers. This is confirmed by the 1949 Ministry of Works report which shows the annual intake of apprentices to be higher than in any other branch of the building industry, except painting, and a considerably higher proportion of apprentices to the total number of men employed. A significant point is that of the 15,358 apprentice electricians, only 2,575 are with local authorities or public utilities. To complete the picture we may say that these authorities employ only 11,288 of the 54,473 electricians.

COSTLY MATERIALS

The past twelve months has seen a considerable rise in the prices of materials which are used largely in the electrical industry. Recently attention has been concentrated on the jump in rubber to 3s 6d a pound; in July last year it was round about 10½d. Tin has reached £830 a ton and less spectacular increases have occurred in the prices of other non-ferrous metals, copper from £104 to £186 and lead from £75 to £96 per ton. The Board of Trade index for non-ferrous metals as a group (1930 = 100) shows a rise from 220.2 in July, 1949, to 325.8 last month. On the other hand the cost of iron and steel has remained practically stable, the rise being only from 258.3 to 261.3. The index figure for coal has actually fallen—from 305.3 to 300.7. Intermediate products show a rise from 256.9 to 287.8. In spite of the increased cost of materials the index for manufactured articles advanced only from 222.3 to 234.9 implying greater production efficiency or lower profit.

Helping the Farmer

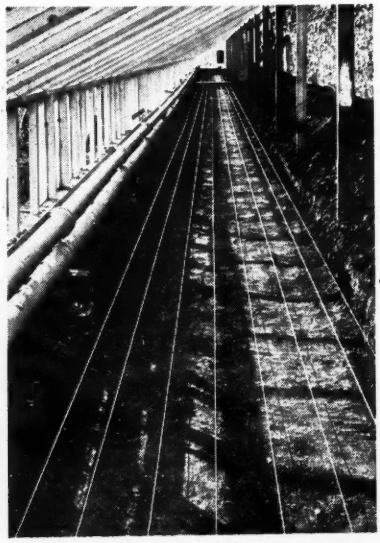
Widespread Applications of Electricity Around Kidderminster

PROBABLY no comparatively small area in this country provides a better opportunity of seeing the varied applications of electricity to farming than the Kidderminster District, Worcester Sub-Area, Midlands Electricity Board (district manager, Mr. E. C. Watson). In its 147 sq mile area, with nearly 300 farms of every type connected, the district not only covers what may nowadays be called the more conventional uses of electricity in dairy and poultry farming, but also offers facilities for utilizing electricity in the less explored spheres of arable farming: market gardening, fruit, hop and mushroom growing, etc.

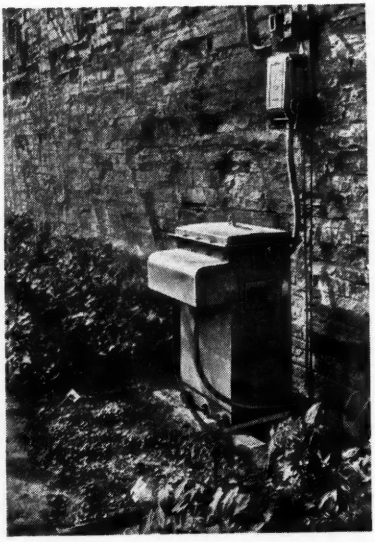
In company with Mr. V. C. Lock, assistant consumers' engineer, Kidderminster District, we recently spent a couple of days looking at some of the more unusual installations. One of the most interesting jobs in the area is an experimental tomato-ripening house which has been constructed at Mr. F. C. Oakley's Austcliffe Farm, Cookley. Measuring 10ft by 8ft by 6ft 6in high, this has been equipped with four lengths of tubular heaters with the standard loading of 60 W per ft, the total loading being 1.9 kW. The door has a gas-tight fit, an externally controlled light permitting inspection through small glass windows. The tomatoes, picked green, are placed in the ripening house in chips, the temperature being thermostatically controlled at 70 deg F and the humidity maintained by a blanket suspended in water. To assist ripening, which normally takes about a week, a small quantity of ethyl gas is injected (one part to a thousand of air). Ventilation holes at the top and bottom can be used if desired, somewhat speedier ripening being possible if the house is ventilated and recharged daily to get rid of the accumulated carbon dioxide gas at the bottom.

Another increasingly important use of electricity, which though of widespread value to horticulture generally is especially applicable to tomato growing, is soil warming, a good example of which is in successful operation in a 150ft by 14ft 6in greenhouse at Mr. A. Kirby's farm at Ham Castle, Shelsley. Bare galvanized wire, strained between iron frames driven into the ground, is bonded to end and centre busbars fed at 30 V from a 15 kVA G.E.C. transformer connected to the 230 V single-phase main

Ethyl gas tomato-ripening house at Mr. F. C. Oakley's Austcliffe Farm at Cookley (*M.E.B. picture*)



Soil heating installation at Mr. A. Kirby's farm, Ham Castle, Shelsley (*M.E.B. pictures*)



supply. An earth leakage trip is provided on the 230 V side of the transformer. The loading is at the rate of approximately 5 W per sq ft, or not quite 11 kW for the whole installation.

Hop drying, peculiar to this part of the country and to Kent, provides further opportunities for introducing electrical methods and, incidentally, encouraging an almost ideal off-peak summer load, the installations being normally operated only from mid-May to mid-September. Though so far the improved, more uniform and uncontaminated drying possible has not been considered to justify the rather higher cost of using electricity for heating, about ten plants have now been equipped with electric fans and otherwise electrified.

The largest of these, belonging to Mr. G. Hodges, of Pigeon House Farm, Leigh Brockamin, serves three 24ft by 4oft kilns and comprises three 5ft fans driven by one 20 and one 10 h.p. single-phase motors. Warmed to a maximum of 140 deg F by passing through a diesel oil-fired heater, the air is blown through the wooden slatted floor of the kilns on which the hops have been stacked on sacking to a depth of 1ft 6in to 3ft. The curing takes between eight and ten hours, including one hour's sulphuring. Mr. Hodges told us that the great advantages of the electrical plant were the greater volume of air available for drying and the ability to stop the heating promptly, the improved control resulting in a better colour of the hops.

When dried, the hops are packed tightly into 1¼ cwt sacks, or "pockets" as they are called, by a ramming machine driven by a 2 h.p. motor which can also be used to operate a hoist. The provision of machines for picking the hops from the vines is under consideration.

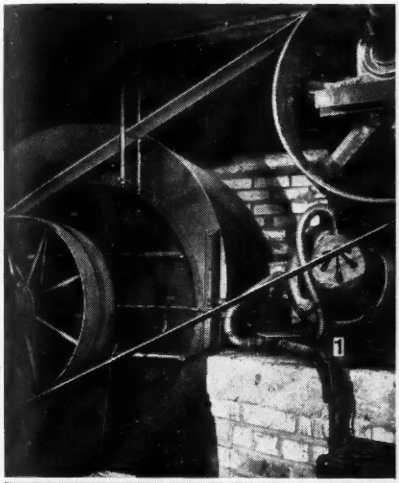
Grass drying is still something of a novelty, and a particularly good example of one of the latest types of installation is to be found at Mr. Nellist Wilkes' farm at Bewdley. This Ransomes, Sims & Jefferies plant has an output of up to 14 cwt per hour. Driving the main fan which blows the hot air from an oil-fired heater through the grass is a 25 h.p. motor. The dried grass is ground up by a Massey-Harris hammer mill (20 h.p. motor). Both motors, as well as smaller units used for elevating, etc., were

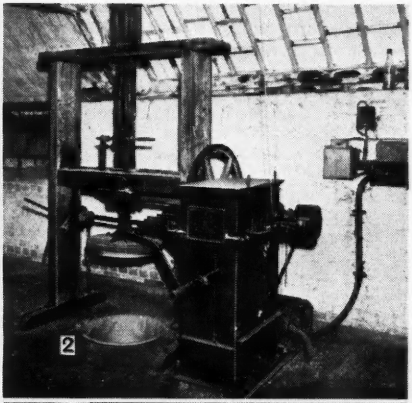
made by the English Electric Co., Ltd.

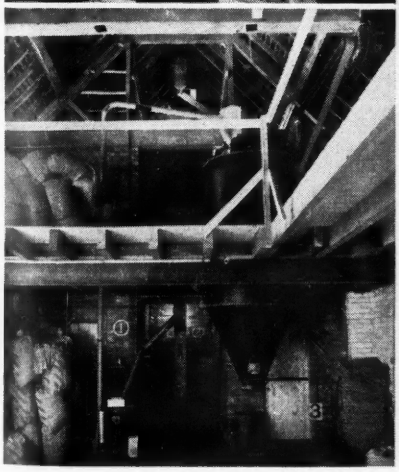
The drying of hay utilizing a draught of air with no heating has now passed the experimental stage and an installation at Kemp's Farm, Martley, has been operating successfully not only for drying hay but beans also. Fans (driven by 2 h.p. motors) located outside the drying barn blow air along ducts which gradually expand from the inlets to a maximum of 3ft across. The hay is placed on chestnut palings rested across the ducts.

A 100 ton apple storage plant employing International Refrigeration Co.'s equipment is to be seen at Mr. H. Entwistle's Upper House Farm, Stamford

(1 and 2) Motor-driven fan of hop drying plant at Mr. G. Hodges' farm at Leigh Brockamin, and a ramming machine for packing the dried hops tightly into sacks or pockets. (3) Grain storage, grinding and mixing installation at Mr. H. S. Poole's farm at Kidderminster. (4) Massey-Harris hammer mill for grinding dried grass at Mr. Nellist Wilkes' farm at Bewdley







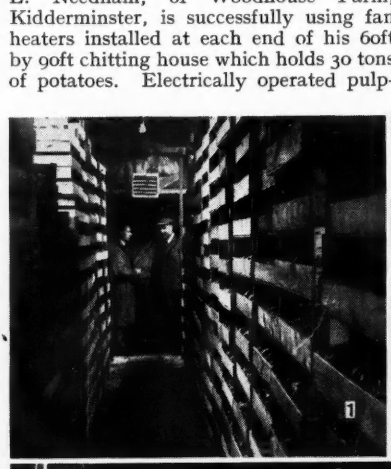
Bridge, while the application of convector heaters to mushroom growing has been satisfactorily adopted by several growers.

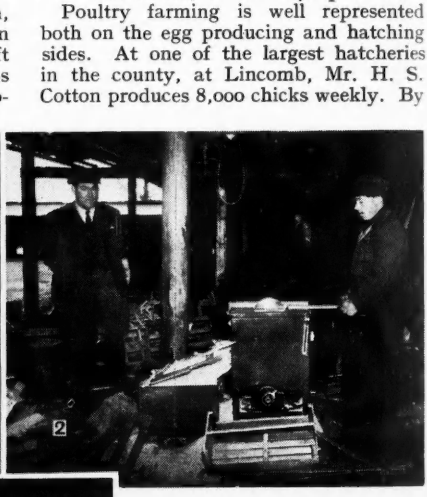
Both the storage and growing of potatoes provide opportunities for making use of electricity. At Dingle Farm, Little Witley, run by Richard Colwell, Ltd., a propeller-type Woods fan driven by a ¾ h.p. motor blows air, for cooling purposes, along a 15in-across semi-circular expanded-metal tunnel in the "bury" whenever the outside temperature is between 33 and 45 deg F. The brick-built storage barn holds 40 tons of potatoes which are packed 8ft deep with a 2ft 6in insulation of straw.

For potato chitting, or sprouting, Mr. L. Needham, of Woodhouse Farm, Kidderminster, is successfully using fan heaters installed at each end of his 60ft by 90ft chitting house which holds 30 tons of potatoes. Electrically operated pulping and grinding apparatus and various equipment used for car and tractor maintenance are also to be found on this farm, and the availability of electricity is put to further good effect in enabling such jobs as wooden box making and stitching sacks for brussels sprouts, peas, etc., to be carried out when the weather would otherwise render work on the farm impossible.

A further possible application of electricity in connection with potatoes now being contemplated on another farm is the cooking of them for feeding pigs and poultry. Employing a 30 kW G.E.C. electrode boiler, it is estimated that it will be possible to cook a ton in 4½ hours at a cost of 11s, or under 7d per cwt.

Poultry farming is well represented both on the egg producing and hatching sides. At one of the largest hatcheries in the county, at Lincomb, Mr. H. S. Cotton produces 8,000 chicks weekly. By





Fan heaters are used in this potato chitting house at Mr. L. Needham's farm, Kidderminster, where the availability of electricity also facilitates such jobs as box making

A higher percentage of hatched eggs is attained at Mr. H. S. Cotton's poultry farm by using one incubator for hatching only

using one of his three 16,000-egg Secura all-electric incubators for hatching only, a higher proportion of eggs hatched is attained (73-74 per cent) and keeping the incubators clean is greatly facilitated, only the hatching unit normally becoming soiled. The eggs are tested for fertility on the transfer to the hatching unit on the eighteenth-nineteenth day. Apart from the heating of the incubators themselves, the chill is taken off the hatching room by tubular heaters.

On leaving the incubators the chicks spend three weeks in the brooder house where eighteen "Marlbank" electric hovers designed by Mr. Cotton himself have been installed. Constructed of aluminium, these hovers are made in two sizes. The smaller, holding 100 chicks, is fitted with a 250 W element and weighs 5 lb; the larger unit, for 150 chicks, has two 250 W elements and weighs 10 lb.

Egg production on the battery system is carried out on a large scale at Torton Farm, Kidderminster. Besides employing time switch-controlled electric lighting in the battery houses to prolong the laying period, Mr. H. S. Poole, who runs the farm, finds an electrically operated pressure pump ideal for the cleaning of the battery cages. He is also very pleased with the grain-storage facilities which he has provided in an existing barn. With the aid of a 1 h.p. Brook motor driving an elevator he can, at a cost of less than a penny, transfer or turn over 6-7 tons of grain an hour in any of four 30 ton silos. Besides being able to transfer grain from one silo to another it is also possible to feed it to a Christy & Norris grinder (with a 10 h.p. Laurence Scott motor) and then, if required, a 30 cwt mixer (7 h.p. Brook motor), to a 2 ton storage hopper.

Electricity for the above services is provided by the Midlands Electricity Board under a special farming tariff with a unit charge of one penny and a quarterly fixed charge of 3s 6d for each 1,000 sq ft of floor area of farm buildings.

We are grateful to all the farmers concerned for granting us permission to inspect their installations. Our special thanks are also due to Mr. Lock for accompanying us on our tour and for assisting us to prepare this article.

Power on Farms

Forty Years' Progress

A SUMMARY of published statistics dealing with the amount and sources of power available on farms in Great Britain since 1908 has been made by D. K. Britton and I. F. Keith, of the Agricultural Economics Research Institute, University of Oxford. Notes and tables appear in the *Farm Economist*. Power on farms is considered under three heads: (1) stationary, (2) draught (mechanical) and (3) draught (animal).

ELECTRIC MOTORS ON FARMS 1908 TO 1948.

Year	England and Wales		Scotland		Great Britain	
	No. (000)	H.P. (000)	No. (000)	H.P. (000)	No. (000)	H.P. (000)
1908	0.2	1	—	—	0.2	1
1913	0.3	2	0.1	1	0.4	3
1925	0.9	6	0.2	2	1.1	8
1931	3.1	19	0.4	4	3.5	23
1937	9.0	43	1.6	13	10.6	56
1939	11.0	48	2.0	14	13.0	62
1942	25.0	98	3.8	21	28.8	119
1944	35.0	126	4.5	22	39.5	148
1946	47.9	163	6.3	29	54.2	192
1948	61.0	195	8.0	37	69.0	232

The accompanying table, compiled from figures which appear in the report, shows the progress made in rural electrical development since 1908, in England and Wales, in Scotland and in Great Britain as a whole. Little progress had been made by 1908 and there were no big strides until 1937; Scotland comparing unfavourably with the rest of the country throughout the whole of the 40 years to 1948.

Total stationary power has shown no significant increase since 1939. On the other hand the number of electric motors installed has continued to increase.

Congo Electrification

A TEN-YEAR scheme for the general electrification of the Lower Congo region, according to M. Wigny, the Belgian Minister of Colonies, is to include the electrification of the 225-mile Leopoldville-Matadi Railway. Hydro-electric power is to be obtained from a plant to be erected at the Tshopo Falls, on the Congo river. The railway electrification is likely to be at 3,000 V d.c.

VIEWS on the NEWS

By REFLECTOR

ONCE again the South Eastern Electricity Board has secured a good "press" by reducing the cost of electricity in a number of its districts. The aim has been to bring down to 1d per kWh all secondary charges above that figure in two-part tariffs. This move towards equity and uniformity raises the question of future policy. If it is considered unfair that some consumers should pay more than others why should prices not have been reduced to the existing lowest level? Is it because those at present paying less than 1d will, sooner or later, be "levelled up"? For 1948-49 the Board's credit balance was only £171,752, on an income of about £13 million, and £138,000 of this was put to reserves. Concessions must be compensated for by increases elsewhere unless there are substantial economies in operation in the face of rising costs.

★ ★ ★

In a note published before the "Twelfth" the *Bulletin and Scots Pictorial* (Glasgow) said that the only proprietors of moors who seemed to be advertising for shooting tenants were the North of Scotland Hydro-Electric Board. The Board apparently took over four moors from the Duke of Argyll and are looking for a return on them. Grouse-shooting is, of course, not the exclusive concern of the North of Scotland Board. The other fourteen Electricity Boards and the Consultative Councils get plenty of it—of a somewhat different nature.

★ ★ ★

From its issue of 10th August, 1850, the *Manchester Guardian* quotes a report of a demonstration of electric lighting at Pendleton a hundred years ago. The demonstrator was a Mr. Staite, referred to as "the patentee of the electric light." Staite mounted his lamp, which was operated by "a powerful battery of 52 jars," on the roof of the Mayor of Manchester's home. It is reported that the exhibition was a successful one although rain interfered with it. The exhibitor was evidently W. E. Staite, who was hardly the originator of the continuous electric arc which Humphry Davy had demonstrated at the beginning of the century. He is, however, credited with the idea of enclosing the arc in a glass globe to retard the consumption of the carbons.

★ ★ ★

An odd bit of heraldry has been discovered by the *Daily Telegraph* in a German Communist organ. It purports to be the "coat of arms of the People's Republic of Korea" and depicts a combination of electric power, irrigation and agriculture. Most of it comprises a mountain range with a dam and hydro-electric power station and a transmission line tower is included. In fact it might be a B.E.A. poster with North Wales power as its subject.

★ ★ ★

It is reported that the Midlands Electricity Board has made a good job of the lighting of Shakespeare's birthplace at Stratford-on-Avon. Hitherto the only illumination has been from flickering rush lamps ("brief candles.") These have been retained but their feeble rays are now augmented by concealed electric lighting. "So doth the greater glory dim the less" and "it adds a precious seeing to the eye."

★ ★ ★

Exaggerated ideas of the extent of domestic electrification in America are prevalent here. A recent article in the *Scotsman* suggests that all the American housewife's work is "left entirely to the genii behind the push-button in a well-equipped house." A description follows of a number of devices which I feel sure are possessed by only a very tiny proportion of American homes. It may be true that the United States is in advance of this country in this respect but there is a foolish tendency to suggest that the unusual is typical.

CORRESPONDENCE

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for the opinions expressed by correspondents

Incentive Schemes

REGARDING the recent article by Mr. Mortimer Hawkins and comments thereon by Mr. W. J. Mann, it would appear that the matter requires further breaking down before any definite opinion can be advanced.

It would be difficult, and even dangerous, to attempt to apply incentive schemes to installations in which metal-clad wiring systems are being used, and with which meticulous attention to bonding and continuity is essential to safety. On the other hand, I see no reason why incentive schemes could not be applied to installations utilizing one of the insulated wiring systems, in which continuity is effected by an incorporated copper conductor.

For housing work especially, which is mainly repetitive work, incentive schemes should show good results, subject to the selection of a suitable wiring system. Such work hardly demands the high standard of skill which Mr. Mann fears might be lost in the application of incentives, and there is little doubt that it could be carried out much faster than at present.

Mr. Mann pleads for the retention of present high standards, but which? Technically, insulated wiring systems are superior to metal-clad systems, but from the aesthetic angle steel conduits have advantages. Should a job *look* good, or *be* good?

T. C. GILBERT.

Folkestone.

IN reply to J. Mortimer Hawkins' letter in your issue of 4th August, I cannot agree that my terminology is confused. Payment by results, incentive schemes and suchlike are piecework, whatever fancy names they may be called.

I am not a shareholder in any company, but purely a paid servant, a supervising engineer who has practical daily contact with large and small installation jobs. As for visiting Sweden, I would very much like to, but unfortunately cannot do so.

Mr. Hawkins must know that a deal of undetected shoddy work can be carried out in any installation unless the operative is a highly skilled man with a sense of moral responsibilty for his calling and proud of his work, no matter how efficient the charge-hand, foreman or engineer may be. One safeguard is that the engineer sorts his staff out to the best of his ability according to the nature of the jobs in hand.

If the industry had operated an efficient apprenticeship scheme in the past maybe to-day we would have operatives producing 50 per cent more as your correspondent wishes. I agree that production per man hour is less than 1939, but the skilled operatives of to-day aged 25 to 30 years were trained during the war period, they have probably done a period of military service and have not had the experience to acquire skill and speed together. These cannot be blamed for not producing as much as older men of the industry, alongside whom they work. This will adjust itself eventually; it is a phase through which we are passing. This problem is common to all trades employed in the building and constructional industries.

W. J. MANN.

Huyton, nr. Liverpool.

The Value of Electricity

"REFLECTOR'S" notes in your issue of 4th August in connection with "*le magnifique effort d'équipement poursuivi par Electricité de France*" might well be elaborated by an abstract—fully translated—of a report in a current periodical on educating the French to appreciate the economic value of the kWh.

At a recent exhibition in Toulouse, a stationary bicycle was equipped with a small generator replacing the back wheel. Visitors were invited to mount and pedal, the exhibition authorities paying the

cyclist the value of the energy output at the current price of power supplied by Electricité de France, 17 francs (about 4¼d) per kWh. The two records set up were (a) 12 minutes' pedalling to produce 0.030 kWh, value 0.51 fr (about ½d) and (b) 30 minutes' pedalling to produce 0.065 kWh, value 1.10 fr (about ¼d).

The article concludes with an admonition not to waste power, adding that the two cyclists would most certainly not do so in future, and requesting the reader to consider how many days' pedalling would be necessary to deal with the weekly wash.

My Scottish heart went out, not to the cyclists, but to the good people of France who pay 17 fr per kWh.

JAMES A. MCCASH.

Richmond, Surrey.

Electricity Discounts

THE statement made at the General Purposes Committee of the Canterbury City Council, as reported in your issue of 4th August, that discounts for prompt payment of electricity bills are to be discontinued, is not in accord with the facts.

No recommendation has been made to the Board for the withdrawal of these discounts and the Board has made no decision to withdraw them.

Hove. C. F. WELLS,
Chief Commercial Officer,
South Eastern Electricity Board.

News from Ireland

OUR Dublin correspondent reports that since the publication of the 1949-50 annual report of the Electricity Supply Board it has been learned that the 10,000 kW generator at the Cliff (Co. Donegal) station has been installed and is likely to be in operation before the end of the present month. Work is proceeding on the Cathaleen's Falls station where the first 22,500 kW set should be available for service in the autumn of 1951 and the second in the spring of 1952. The second generating set for Portarlington (Co. Leix) turf station is on its way from Sweden.

Tests for the production of milled peat have just been announced. They are being carried out by Bord na Mona, on a 3-acre bog at Bangor, Co. Mayo; if successful this fuel will be extensively used for electricity generation and other industrial purposes. It is in dust form and will be briquetted for domestic purposes. Officials of the Turf Board have been studying its utilization in Russia and Sweden.

The rural electrification stand of the E.S.B. is one of the most striking and educative features of the Dublin Horse Show. Farmers are shown how to improvise an animal food cooker consisting of an oil drum surrounded by turf and encased in a plywood box, the heating unit being two six-pint kettle elements. A 50-gal. container of this type can be made for £5, it is stated. There are several illustrations of the utility of small electric motors with appropriate reduction gearing, such as to horse clippers and for grinding the blades of mowing machines. Among domestic equipment, besides electric cookers and clothes-washing machines, there is an electric dish-washer, priced at £47; it holds up to 100 pieces of china, glassware, silver, pots and pans. For ten guineas there is a new mixing machine suitable for every type of food.

To be eligible for employment by the E.S.B. all electricians must in future be members of a trade union. This is the outcome of a conference between the Congress of Irish Unions and the Board.

E.I.B.A. Activities

THE annual meeting of the Electrical Industries Benevolent Association will be held on 15th September in the Council Room of the Institution of Electrical Engineers, Savoy Place, London, W.C.2.

The annual ball of the Sussex Centre of the Association will be held on 20th October at King Alfred, Hove. Tickets (21s each) can be obtained from the hon. secretary and treasurer, Mr. E. G. Heath, c/o Electric House, Castle Square, Brighton, 1 (telephone: Brighton 25831).

The annual carnival dance of the Birmingham Branch Area of the Association will again be held at the Magnet Club, G.E.C. Works, Witton, Birmingham, on 6th October. Tickets will shortly be on sale from committee members. Particulars can be obtained from the hon. secretary, Mr. L. Wall, Electrical Components, Ltd., 102, Snow Hill, Birmingham, 4.

"ELECTRICAL WHO'S WHO"

Brief biographies of about 2,600 leading men and women in all branches of the industry appear in the "Electrical Who's Who." Copies are obtainable from the *Electrical Review*, Dorset House, Stamford Street, London, S.E.1, or from booksellers, price 12s. 6d. (postage 7d.)

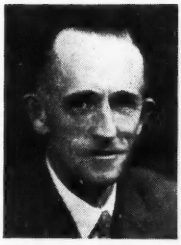
PERSONAL and SOCIAL

News of Men and Women of the Industry

THE Minister of Fuel and Power has appointed **Sir Tristram Edwards,** of Neasham, Darlington, to be a part-time member of the North Eastern Electricity Board.

Sir Tristram is vice-chairman and managing director of Smith's Dock Co., and was president of the Shipbuilding Employers' Federation in 1933. He is also a director of the Consett Iron Co.

Mr. A. L. Wallwork, A.M.I.E.E., has been appointed power sales engineer in the Consumers' Engineer's Department, No. 5 Sub-Area of the North Western Electricity Board. Mr. Wallwork previously held posts on the mains and technical staffs of the Blackburn electricity undertaking until being appointed senior assistant (power sales), No. 5 Sub-Area, in 1948. His duties for some years included considerable practice in street-lighting development, and he is a member of the Association of Public Lighting Engineers.



Mr. A. L. Wallwork

Miss Margaret Chadburn, senior demonstrator on the Blackburn staff of the North Western Electricity Board, has been appointed senior demonstrator for the whole of No. 5 Sub-Area.

Mr. G. T. Maycock is leaving Babcock & Wilcox, Ltd., on 31st August to take up the position of sales engineer with the Morecambe Electrical Equipment Co., Ltd., and will represent them in Lancashire, Cheshire, North Wales and Derbyshire.

Dr. J. H. Dobson has been elected an honorary member of the Association of Municipal Electricity Undertakings of Southern Africa, of which he was one of the three founders and also the first president (1915-17).

At the Council meeting following the annual general meeting of the **Scientific Instrument Manufacturers' Association** held on 13th July, the following officers for 1950-51 were elected: President: Mr. M. H. Taylor. Vice-presidents: Mr. J. E. C. Bailey, C.B.E., and Mr. A. W. Smith. Hon. treasurer: Mr. S. Borthwick. Hon. secretary: Mr. J. Rock Cooper.

In late September, **Mrs. M. L. Pearce** sets off for France on a two-months' tour of investigation into the main factors governing the development of domestic electricity in that country. As the sixth holder of a Caroline Haslett Travelling Exhibition she will make a special study of the Frenchwoman's reaction to electricity as a contribution towards efficient household management, and she will pursue her inquiries in both town and country districts. Mrs. Pearce is senior demonstrator in the Bristol and North Somerset Sub-Area of the South Western Electricity Board. She is the daughter of Mr. A. E. Marson, formerly secretary of the Electricity Commission and now with the Ministry of Fuel and Power.

The **Young Trophy,** awarded in competition between the London students of the Institutions of Civil, Mechanical and Electrical Engineers, has been held by the Electricals for the third year running. They succeeded in winning the association football, table tennis, rifle shooting and cricket matches, but were beaten by the Civils at tennis. After the matches on 29th July, the last day of the competition, Mr. A. H. Young, son of the donor of the trophy, presented it to Mr. I. J. Shelley, the chairman of the I.E.E. London Students' Section.

OBITUARY

Mr. A. L. Gray.—The death occurred on 8th August at Camborne of Mr. Arthur Lionel Gray, A.S.I.A.A., F.C.I.S., Cornwall Sub-Area accountant of the South Western Electricity Board. Mr. Gray, who was in his sixty-second year, was educated at the City of Oxford School and in 1911 was appointed to the staff of the Oxford city treasurer, rising to be deputy city treasurer. He first joined the electricity supply industry in 1922, when he became secretary and accountant, later secretary and manager, to the Oxford Electric Supply Co., and in 1935 he took up the appointment of Oxford district manager to the Wessex Electric Power

Co. He went to Cornwall in 1943 as chief accountant to the Cornwall Electric Power Co., the Ilfracombe Electric Light & Power Co. and the Dartmouth Urban Electric Supply Co.

Mr. H. M. Ackery.—The death occurred on 6th August, at the age of eighty, of Mr. H. M. Ackery, M.I.E.E., who had spent most of his working life with the Admiralty, with which he was superintending electrical engineer when he retired at the age of sixty-one. Mr. Ackery was the father of Mr. E. M. Ackery, heating engineer to the British Electrical Development Association.

Mr. A. Blanks.—The death is reported at the age of sixty-six of Mr. Albert Blanks, A.M.I.E.E., which occurred on 7th August. Mr. Blanks was for many years associated with the electrical industry, having been with the A.E.C. in London, works manager of the Electrical Department of A. W. Penrose & Co., and (from 1905 to 1910) consumers' electrical adviser with the St. Pancras electricity undertaking. During the 1914-18 war he served with the Air Ministry. In later years Mr. Blanks left the electrical industry and went into business as a coal merchant.

WILLS

Mr. R. Hirst, technical director of Johnson & Co. (Bradford), Ltd., who died on 24th May last, left £2,857 gross (£2,759 net).

Mr. C. V. Hill, electrical engineer, of Belfast, who died on 18th November, 1947, left estate in England and Northern Ireland valued at £102,294.

Mr. A. T. Wells, of Southampton, retired electrical engineer, who died on 27th April last, left £32,222 gross (£32,099 net).

British Association Meeting

THE final programme for this year's meeting at Birmingham of the British Association for the Advancement of Science (30th August to 6th September) has now been issued. Sir Harold Hartley, K.C.V.O., F.R.S., is the president and his address at the inaugural meeting on 30th August will be entitled "Man's Use of Energy." Although no general theme has been set for this year's meeting, "Energy in the Service of Man" has been suggested by Unesco as a topic for world-wide discussion in 1950 and, apart from the presidential address being in this vein, an exhibition illustrating the theme is to be held in the University at Edgbaston, together with a series of five lectures at the Midland Institute, one of which will deal with the production and distribution of power.

The chairman of Section G—Engineering—is Prof. Andrew Robertson, F.R.S., who in his address will deal with a chapter in bridge engineering a century ago. In the same section items of interest to electrical engineers include a lecture by Prof. A. Tustin on progress in automatic control systems and others by Prof. O. A. Saunders, Dr. A. T. Bowden and Dr. J. S. Clarke, who will deal respectively with gas turbines for aircraft, some aspects of stationary gas turbines and combustion in gas turbines.

Electrical manufacturers will no doubt be interested in the session on production engineering, which is to be opened by Prof. T. V. Matthew.

In Section A—Mathematics and Physics—five of the speakers are to deal with high energy particles and machines for their acceleration. Prof. R. E. Peierls, F.R.S., will discuss problems in the study of high energy particles, while Mr. D. W. Fry will deal with the linear accelerator and Dr. L. V. Hibbard will describe the Birmingham proton synchrotron. Dr. T. G. Pickavance will then discuss experiments with the 110in Harwell cyclotron and, in conclusion, Mr. K. F. Goward will speak on the study of photo-disintegrations produced in photographic plates by a synchrotron.

Another session will deal with the civil applications of atomic energy. This will be opened by Sir John D. Cockroft, C.B.E., F.R.S., who will deal with the problems and prospects of nuclear power development. Some problems of illumination are also included in this Section, the papers being concerned with the lighting of picture galleries and museums and airport lighting.

A joint session of Sections A, G and J (Psychology) will study the presentation of technical information. Prof. R. O. Kapp will give a general survey, Mr. L. Bainbridge-Bell will deal with the need for clearer circuit diagrams and Mr. Geoffrey Parr with the technical author and his publisher. Miss M. D. Vernon will present the psychologist's view and Mr. F. M. Colebrook the administrative view.

Also in connection with the meeting, two demonstration lectures of a popular nature are to be given to children by Dr. P. Dunsheath on 2nd September in the Digbeth Institute. The customary programme of tours, etc., will include visits to Walsall power station and a number of industrial establishments.

Power Grid for Europe?

German Views Conflict with Italian Opinion

IT has long been supposed that some day the countries of Europe would become electrically interconnected so that more effective international use could be made of national sources of power. The idea is still being debated, though opinions differ about the economic possibilities of the project in present political circumstances.

At the 44th annual meeting of the Verband Deutsche Ingenieure (V.D.E.), in June, at Cologne, for instance, Prof. Dr. Ing. e.l. J. Biermanns (A.E.G. high-voltage switchgear factory) expressed the view that the "new network planned to be superposed" upon the European power system could easily incorporate the 600 km three-phase line from Vorarlberg to the Ruhr. This double-circuit line, established (1923-28) by the Rhineland-Westphalia electricity organization, was at first operated at 220 kV, but it had been designed for 400 kV. Its transmission capacity could be increased to 1.2 million kW; therefore the amount of energy that would be required could be conveyed in the form of three-phase a.c., if the 42 mm diameter hollow conductors were replaced by four steel-aluminium cables, each of 21 mm cross-section.

Full-scale Tests

Test lines had been erected on a full-size scale to enable the A.E.G. to determine in winter weather the effects of hoar frost on the behaviour of, and corona loss from, so-called "bundle conductors" at specified distances from one another. Transformers had been designed as single-phase units, each of 100,000 kVA, for transport by railway; circuit-breakers would be of the compressed-gas or low-oil-content types, while so-called "shear disconnectors" would make possible the design of switching stations requiring surprisingly little space.

Development in anticipation of the need for a 400 kV compound network with up to 8 million kVA prospective short-circuit capacity had been practically completed shortly before the war. That development work had been laid aside in 1945 but it had recently been resumed so that the German electrical industry (the Professor said) could look forward with confidence to the tasks which he believed it would shortly be required to undertake.

Marginal Couplings Preferred

In contrast thereto Dr. Ing. Vittorio di Biasi (director-general, Società Edison) questions whether an interconnecting super-grid is called for in Europe at present. A paper he has published in Milan seeks to show that the technical and economic advantages of a super-grid can be gained equally by marginal coupling between the existent grids, in view of the moderate quantities of energy which, having regard to the present situation in Europe, can be rendered available for export from the regions of greatest resources. This fact renders it advisable to use the limited funds at present available for the construction of new generating plants rather than of a super-transmission grid.

In support of the thesis the paper argues that there is no economic expediency in conveying the power produced in thermal stations rather than coal and then indicates various technical difficulties which would have to be overcome to make it possible to operate a great interconnecting network at super-high voltage.

From statistical data on the anticipated increase of consumption and the present and future shortage of power in Europe, the author concludes that there is no technical or economic justification for giving the construction of a big super-grid priority over the ever-increasing need for building power stations capable of alleviating the present shortages; nor can it be of interest for practical purposes to discuss now what engineering progress will permit of the carrying out of such a project at an uncertain date on the basis

of hypothetical economic conditions which can only begin to warrant the existence of major lines of interconnection in the distant future.

By keeping more to the way we are already proceeding, towards marginal couplings, we shall be led naturally to evolution according to the emergence of new needs and the progress of engineering. This does not mean that Europe will not one day find itself with a supergrid, self-made, so to speak, according to realistic response to the conditions actually prevailing.

Practical engineering does not lend itself to unduly brilliant flights of fancy, but is limited to the provision of instruments satisfying the purpose intended in the most economic manner. The financial and industrial resources available in Europe could not rightly be squandered on enterprises which do not possess a secure economic basis.

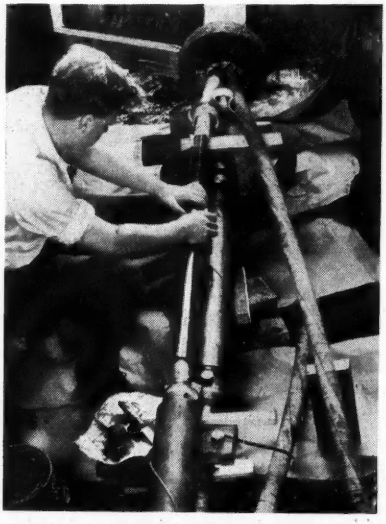
If power system interconnection is to be initiated as a means for cementing European solidarity by intensifying reciprocal assistance, it will be effective and constructive only if it complies with the soundest criteria of economy and practical engineering.

Gas Compression Cable

Installation and Jointing Techniques

DURING last week we watched work in progress near Bedford on the installation and jointing by Enfield Cables, Ltd., of a 3,250-yard length of 0.25 sq in 132 kV three-core s.l. oil-pipe-line gas compression cable, which is to feed a load of 85 MVA.

When we arrived on the site the pipe-line had already been installed, with jointing bays left at 250yd intervals. Some of the cable had been drawn in and jointing was in progress.



Building up the insulation of the gas cable joint by hand-applied paper tapes

The 5.5in external diameter steel tubing for the pipe-line is received in random lengths of about 25ft to 40ft and welded on the side of the trench into a continuous tube between jointing bays, the depth of laying being 2ft 6in.

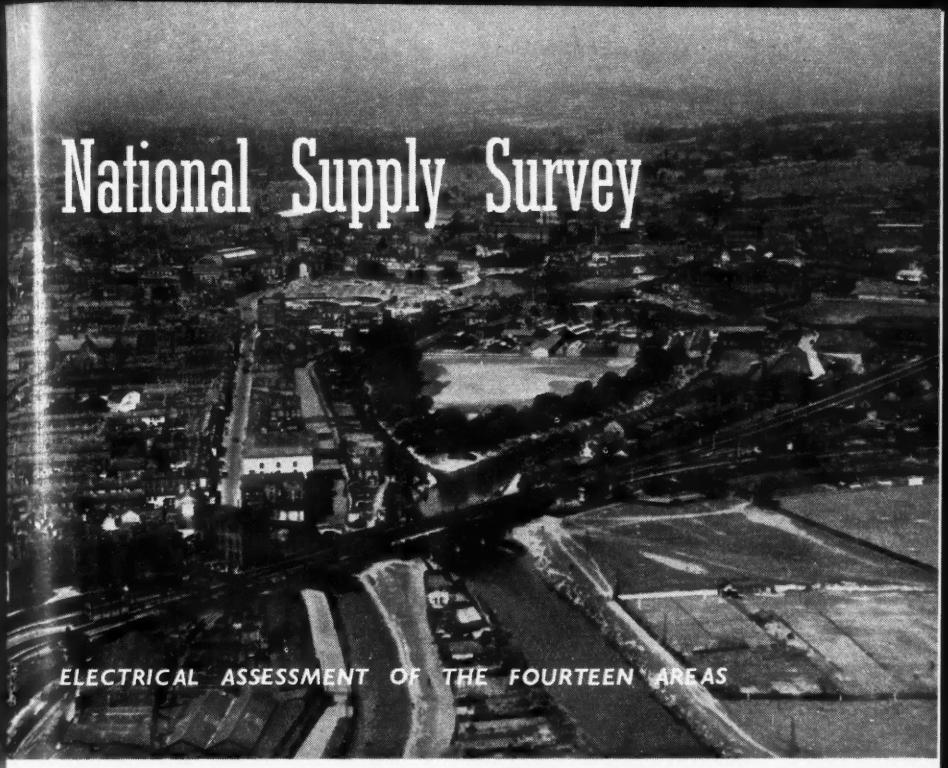
To assist drawing in, D-shaped copper skid wires are laid up around each of the three cores, which are in turn also laid up. The cable is drawn in manually and throughout the process grease is liberally applied.

The jointing technique is straightforward and simple, the conductors being joined by means of a sweated flush-type ferrule, the insulation pencilled down and re-made with hand-applied paper tapes. The joint casing consists of a fluted copper sleeve and the three jointed cores are contained within a steel sleeve which is welded to the pipe-line at either end.

Single-core self-contained compression cable tails are jointed to the three-core cable by a trifurcating box and single-wall stabilized glazed porcelains are used for the end terminations. capable of withstanding the full oil pressure of 200 lb/sq in maintained on the end by means of a compensator equipment.

No provision is made for automatically feeding the nitrogen gas into the cable. The cable is shut in and gas loss, if any, can be made up simply by connecting a cylinder to the inlet valve and building up to the requisite pressure of 200 lb/sq in, electrical contact gauges controlling the pressure to within definite limits.

National Supply Survey



ELECTRICAL ASSESSMENT OF THE FOURTEEN AREAS

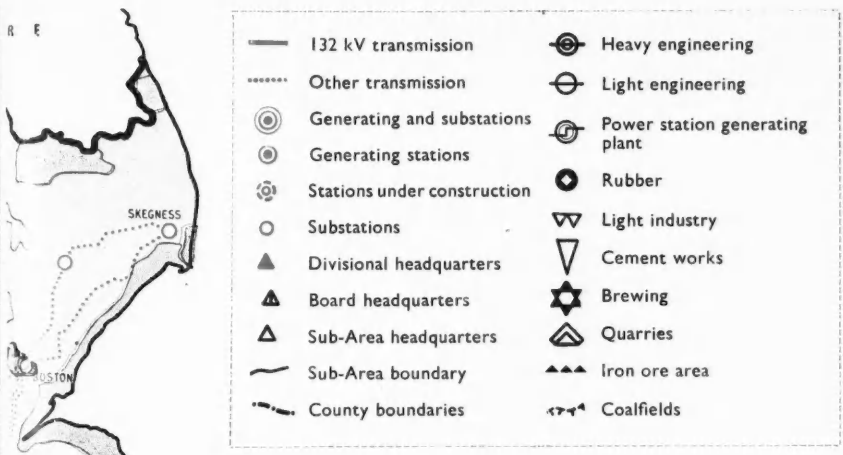
14.—EAST MIDLANDS AREA

WHEN we first saw a map of the new East Midlands Electricity Supply Area, which was prepared by the East Midlands Electricity Board to show the Sub-Area divisions, our attention was arrested particularly by the "island" Sub-Areas of Derby, Nottingham and Leicester, and the "almost island" Sub-Areas of Coventry and Burton and District. And our impression was intensified when investigation showed that in each of four of these instances — Derby, Nottingham, Leicester and Coventry—the Sub-Area territory conforms precisely with that administered by the former undertaking of the same name.

On the Division, or generation and primary transmission, side reference to the composite map published in the *Electrical Review* of 3rd June, 1949, shows that the boundary common to both the Midlands and East Midlands Electricity Areas divides the Birmingham grid control area into two almost equal parts, while a very large part of the East Midlands Division

Derby and Nottingham Sub-Areas are "island" Sub-Areas, each comprising precisely the territory of the former municipal undertaking. Derby is depicted above (*Aerofilms photo*), **and below is the Council House, Nottingham**

TO ROTHERHAM
YORKSHIRE
YORKSHIRE
TO GRIMSBY
NORTH WESTERN
EAST RETFORD
CHESTERFIELD
LINCOLN
STAYTHORPE
SLEAFORD
DERBY
SPONDON
NOTTINGHAM
WILFORD
GRANTHAM
BURTON UPON TRENT
MELTON MOWBRAY
LOUGHBOROUGH
BOURNE
LEICESTER
STAMFORD
FREEMANS MEADOW
TO PETERBOROUGH
TO NECHELL'S & HAMS HALL
HINCKLEY
CORBY
LONGFORD COVENTRY
KETTERING
TO LITTLE BARFORD
AVON
NORTHAMPTON
TO BEDFORD
BUCKINGHAM
MIDLANDS
SOUTHERN
EASTERN



Because of the "extremes" of the East Midlands Area we have once again used a characterizing background based on the O.S. "Population Density" map in the electrical assessment map which has been specially prepared by the *Electrical Review*. The population density of the Area is indicated as follows:—dense urban in white, urban in blue, dense rural in red and sparse rural in grey. Outlines of the coal and iron ore fields are also shown

remains in the Leeds grid control area. It is not exceptional for parts of one Division to be controlled from different grid control centres, but the overlapping is particularly marked in this case.

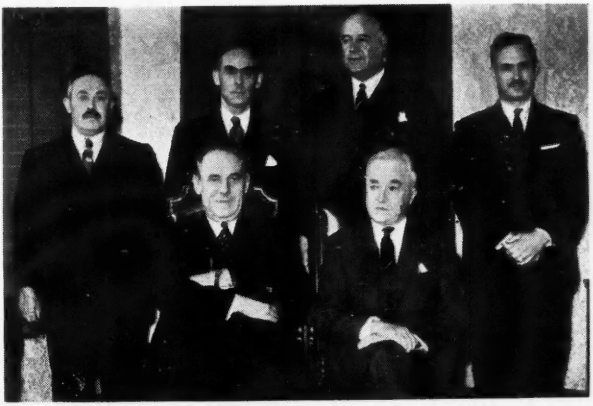
It is the unusual partitioning of the Area on both the Board and Division sides, as outlined above, which has influenced us to open this article on the organizational aspects. The policy of the East Midlands Electricity Board in creating Sub-Areas and Districts from the 33 former undertakings was to preserve as far as possible the existing administrative centres, to enable the change-over to be carried out with the minimum disturbance to consumers and staff.

The municipal undertakings of Derby, Coventry, Leicester and Nottingham were each administering a compact densely populated area, and their problems were similar in character. In each case the territory over which the former undertaking exercised statutory power therefore became a Sub-Area. A fifth Sub-Area was created by combining the territory of the former undertakings of the County Borough of Burton-upon-Trent and the Uttoxeter U.D.C.

Arising out of the same basic principle the Derbyshire and Nottinghamshire Sub-Area includes the territory formerly administered by the Derbyshire and Nottinghamshire Electric Power Co. and by the former municipal undertakings of Ashbourne, Chesterfield, Bolsover, East Retford, Mansfield, Long Eaton, Newark and Worksop. Similarly the Leicestershire and Warwickshire Sub-Area includes the territory administered by the former undertakings of the Leicestershire and Warwickshire Electric Power Co. and its associated companies the Midland Electric Light and Power Co., Ltd., and the Tamworth District Electric Supply Co., Ltd., together with the territories of the former municipal undertakings of Loughborough, Nuneaton and Rugby.

Again the territories of the former Northamptonshire Electric Light and Power Co. and of its subsidiaries the Rushden and District Electric Supply

The Derbyshire Hills (Matlock) depicted above, and the flats of Lincolnshire (Spalding in foreground) shown below, represent one of the many extremes of the East Midlands Area *(Photos: Aerofilms*



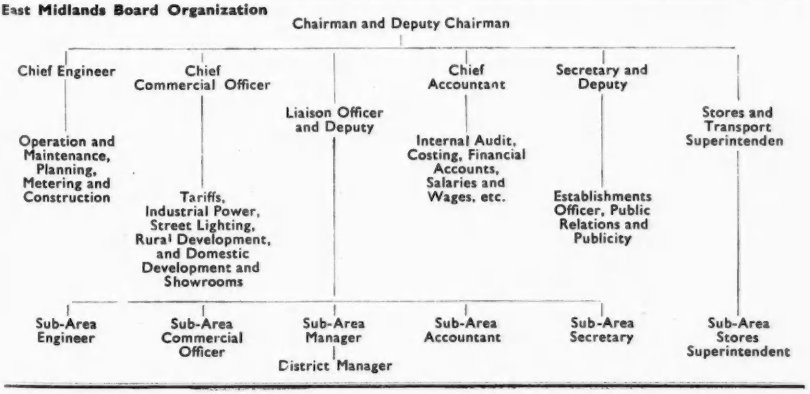
East Midlands Board executive team. Seated left to right, Messrs. C. R. King and J. Mould. Standing left to right, Messrs, C. W. Flint, P. H. De Keyser, A. G. Connell and N. F. Marsh

Co., Ltd., and the Wellingborough Electric Supply Co., Ltd., together with the territory of the former Kettering municipal undertaking, all constitute the Northamptonshire Sub-Area. The Lincolnshire Sub-Area comprises the territories administered by the following former undertakings: Sleaford U.D.C., Spalding U.D.C., Boston and District Electric Supply Co., Melton Mowbray Electric Light Co., Mid-Lincolnshire E.S. Co., Oakham Gas and Electric Co., and the Urban Electric Supply Co. (Grantham and Stamford).

The following service centres are associated with the former undertakings, and we give them in Sub-Area order. *Derbyshire and Nottinghamshire:* Ilkeston, Matlock, Ashbourne, Chesterfield, Retford, Long Eaton, Mansfield, Newark and Worksop. *Lincolnshire:* Boston, Skegness, Grantham, Lincoln (two), Melton Mowbray, Oakham, Spalding, Stamford and Bourne. *Leicestershire and Warwickshire:* Hinckley, Coalville, Leamington, Loughborough, Nuneaton, Rugby and Tamworth. *Northamptonshire:* Northampton, Bletchley, Buckingham, Daventry, Newport Pagnell, Olney, Oundle, Rushden, Stoney Stratford, Thrapston, Towcester, Wellingborough, Wolverton, Kettering, Market Harborough and Corby. *Derby Sub-Area:* Derby (two). *Nottingham Sub-Area:* Nottingham. *Leicester Sub-Area:* Leicester. *Coventry Sub-Area:* Coventry. *Burton and District:* Burton-on-Trent and Uttoxeter.

We will now outline the major organizations with regard to their operation, and for this purpose we reproduce simplified organization trees. We must again emphasize that it is not our object

East Midlands Board Organization


Chairman and Deputy Chairman
Chief Engineer
Chief Commercial Officer
Liaison Officer and Deputy
Chief Accountant
Secretary and Deputy
Stores and Transport Superintenden
Operation and Maintenance, Planning, Metering and Construction
Tariffs, Industrial Power, Street Lighting, Rural Development, and Domestic Development and Showrooms
Internal Audit, Costing, Financial Accounts, Salaries and Wages, etc.
Establishments Officer, Public Relations and Publicity
Sub-Area Engineer
Sub-Area Commercial Officer
Sub-Area Manager
District Manager
Sub-Area Accountant
Sub-Area Secretary
Sub-Area Stores Superintendent

to deal with the activities of the Boards and Divisions in these articles, which are designed essentially to assess Areas.

In the case of the East Midlands Electricity Board the executive team, which operates from the Board headquarters at Mapperley Hall, Nottingham, consists of Mr. C. R. King, chairman; Mr. J. M. Mould, deputy chairman; Mr. A. G. Connell, chief engineer; Mr. N. F. Marsh, chief commercial officer; Mr. C. W. Flint, chief accountant; and Mr. P. H. De Keyser, secretary. The same departmental division is maintained in each Sub-Area, except that in some cases the functions of both secretary and accountant are combined in one officer.

Also in Nottingham, at British Electricity House, Barker Gate, in the old area of the Nottingham Lace Market, is the headquarters of the East Midlands Division of the British Electricity Authority, where Mr. W. S. Burge, divisional controller, leads his executive team, the other members of which are Mr. P. Ormiston, chief generation engineer (operation); Mr. F. Favell, chief generation engineer (construction); Mr. J. D. Pierce, transmission engineer; Mr. W. W. Smith, technical engineer; Mr. C. G. Willett, divisional secretary; and Mr. H. R. Niven, divisional accountant. These principal officers, in turn, have their assistants, as is indicated in the accompanying organization tree. The tree may be modified in the light of later experience, but it serves to give a general idea of the organization which is being built up on the framework of the former Central Electricity Board and is, of course, subject to guidance and direction by the B.E.A. principals in London.

The Area covers about 6,000 sq miles, making it third in size among the Electricity Areas. It embraces the whole of Leicestershire, Rutlandshire and Northamptonshire, major portions of Derbyshire, Lincolnshire and Nottinghamshire, and smaller parts of Bedfordshire, Buckinghamshire and Staffordshire. The aggregate population is about 3.25 million, giving an overall population density of around 540 per sq mile. The Area is a land of extremes, however, and the population density figures range from about 77,000 per sq mile in some of the city wards to less than six per sq mile in the more remote parishes of North

East Midlands Division executive team. Seated: left to right, Messrs. P. Ormiston, W. S. Burge and F. Favell. Standing: left to right, Messrs. C. G. Willett, W. W. Smith, H. R. Niven and J. D. Pierce

Derbyshire and Lincolnshire. Within the Area also lies the widest diversity of country, ranging from the Peak District of Derbyshire and the Forest of Charnwood to the hunting country of Cottesmore and Quorn and the fertile flats of Lincolnshire.

The Area has a rich historical and cultural background. Of Roman heritage there is Fosse Way right through the Area, linking Devon with Lincoln and the North. In the east there is the character built up from the destruction by flood and tide ever since the Romans made the first scientific attempts to check the floods by such works as Fosse Dyke. One good result of the flooding is the extremely fertile soil of Lincolnshire, and we now have in Boston, which was once a principal port, the chief agricultural centre of the district. Then there is that "old, confused town—long, uneven, steep and rugged" (John Evelyn)—Lincoln City, where there was a pre-Roman settlement on the hill top.

The Area also possesses the historic cities of Nottingham, Leicester, Derby, Coventry and Warwick.

Despite the "extremes," the Area provides reasonably balanced loading conditions owing to the wide diversity of its industry. This ranges from the great basic industries of coal, mainly in the thickly populated industrial belt on the Derbyshire, Nottinghamshire and Leicestershire coalfield, where there is much rural industry, and iron and steel around Chesterfield, to the fine and delicate manufacture of lace and hosiery at Nottingham and Leicester. Almost every industry is represented—even shipbuilding at the riverside yards at East Stockworth and Walkeringham, near Gainsborough.

Among the largest consumers are the National Coal Board, whose collieries throughout the area are responsible roughly for an annual public supply consumption of 105 million kWh; Stewarts & Lloyds, Ltd., who consume in the smelting of iron and the manufacture of steel at Corby something like 165 million kWh annually; British Celanese, Ltd., who take about 150 million kWh per year in the production of rayon at Spondon; and Courtaulds, Ltd., whose consumption at their rayon factory in Coventry is about 48 million kWh per year.

The automobile industry in the Area embraces such well-known names as

Rolls-Royce, Daimler, Morris, Armstrong Siddeley, Alvis, Singer, Ford and Standard-Jaguar. The Area's light engineering and allied industries bring forward some "household" names, too: Ericsson Telephones; Worthington Simp-

ESTIMATED LOCATIONAL LOAD ANALYSIS—1948-1949.

Sub-Area	Size of Territory Square Miles	Estimated Population	Consumers	Industries	Consumption Millions kWh	M.D. Thousands kW
No. 1— Derbyshire and Nottinghamshire.	1,438	880,000	184,100	Coal (E. Derbyshire and Nottinghamshire). Iron smelting (Stanton and Staveley). Quarrying and lead mining (N. Derbyshire). Cement (Barnstone). Gypsum (Balderton, E. Leake and Gotham). Heavy engineering (Staveley). Light engineering (Newark and Chesterfield). Telephones and pharmaceutical (Beeston). Rope (Eastwood and East Retford). Glass (Worksop). Paint (Matlock). Rayon (Spondon). Hosiery (Mansfield, Belper, Ilkeston, Long Eaton and Sutton-in-Ashfield). Lace (Long Eaton).	658	163.2
No. 2— Lincolnshire	2,154	423,000	99,000	Light engineering (Lincoln and Grantham). Cement (Ketton). Arable farming (S. Lincolnshire). Sugar beet (Lincolnshire). Potatoes (Lincolnshire). Horticulture (Spalding and Boston).	229	64.7
No. 3— Leicestershire and Warwickshire.	1,141	532,000	144,200	Heavy engineering (Loughborough and Rugby). Light engineering (Loughborough and Warwick). Coal (N. Leicestershire and N. Warwickshire). Stone quarrying (N.E. Leicestershire). Cement (Rugby, Southam). Hosiery (Hinckley and Lutterworth). Rayon (Nuneaton). Elastic web (Sandiacre and Quorn). Felt hats (Atherstone). Sheep farming (Leicestershire and Warwickshire). Horticulture (Leicestershire and Warwickshire).	416	119.8
No. 4— Northamptonshire.	1,160	474,000	116,400	Iron smelting (Stanton, Corby and Wellingborough). Heavy engineering (Wolverton and Duston). Boots (Kettering, Towcester and Northampton). Brick making (Northamptonshire). Sheep farming (Northamptonshire).	421	108.1
No. 5— Derby	56	188,000	59,300	Heavy and light engineering. Paint.	192	60.1
No. 6— Nottingham	70	416,000	128,800	Iron smelting, light engineering, hosiery, tobacco, lace.	292	100.0
No. 7— Leicester	50	310,000	93,500	Light engineering, rubber boots, hosiery.	268	92.6
No. 8— Coventry	61	289,000	78,100	Automobiles, aircraft components, rayon, light engineering.	374	110.7
No. 9— Burton and District.	152	111,000	31,200	Rubber, glass, brewing.	90	27.6
East Midlands Area.	6,282	3,613,000	934,600		2,940	Aggregate 846.8

son; Ransome & Marles; Ruston & Hornsby; Lockheed Hydraulic Brake Co.; British Timken; Qualcast; Leys Malleable Castings; Raleigh Cycle Co.; British United Shoe Machinery Co., Ltd.; Dunlop Rim & Wheel Co.; British Piston Co.; and "Players." In cement production there are the Associated Portland Cement, Ketton Portland Cement and Rugby Portland Cement concerns. The Chilwell Ordnance Depot, many R.A.F. aerodromes like Cranwell, the B.B.C. radio transmitting station at Daventry and the G.P.O. radio transmitting station at Rugby are all high in the list of consumers.

The reasonably balanced loading conditions and industrial diversity to which we have referred offer the favourable opportunity to prepare the informative locational load analysis table on p. 282.

The way is now clear for an attempt at load analyses proper, based on the foregoing overall consumption figures. First we analyse the estimated total load and then give similar tables for the industrial and domestic sections, the domestic one being deduced from the tariff position.

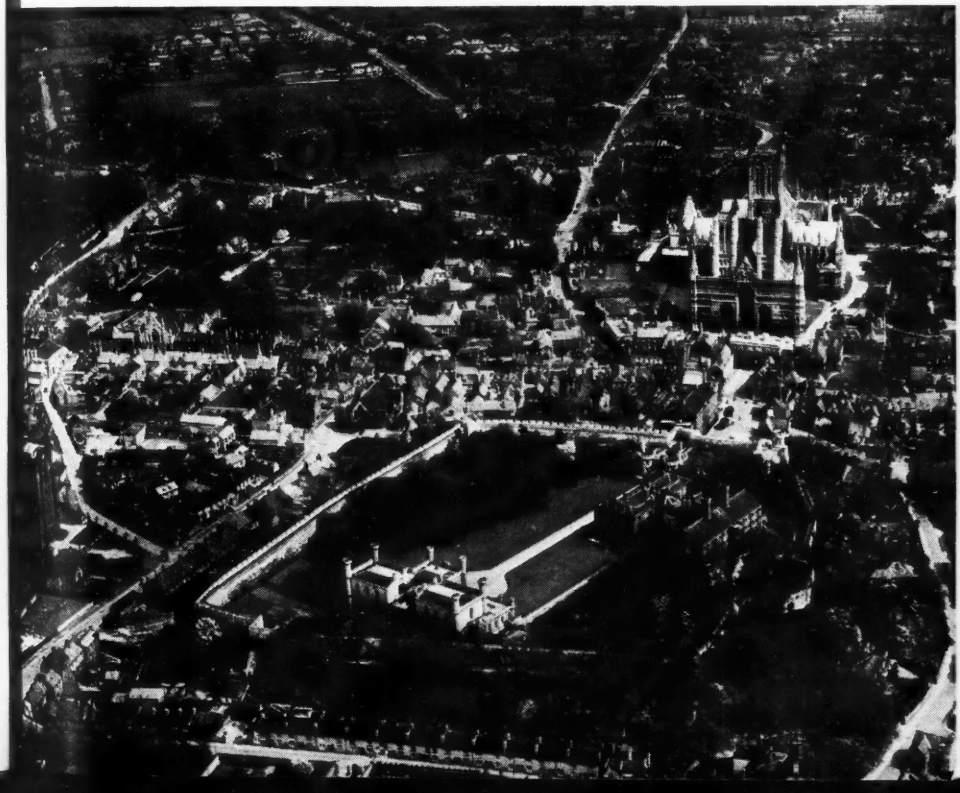
ESTIMATED TOTAL LOAD ANALYSIS

Load Classification	Million kWh
Industrial...	1,646
Domestic	1,000
Commercial	294
TOTAL	2,940

ESTIMATED INDUSTRIAL LOAD ANALYSIS

Load Classification	Million kWh
Iron smelting	200
Coal	200
Automobile	100
Heavy engineering	100
Light engineering	100
Quarrying	50
Rubber	50
Boots	50
Cement	50
Hosiery	50
Agriculture	50
Miscellaneous	646
TOTAL	1,646

"An old confused town long, uneven, steep and rugged": Lincoln with its magnificent cathedral



ESTIMATED DOMESTIC LOAD ANALYSIS

Type of Tariff	Percentage of Total
Flat rates—mainly lighting	25
Flat rates—heating and cooking ...	40
Two-part tariffs—lighting, heating and cooking...	30
Small power	5
TOTAL	100

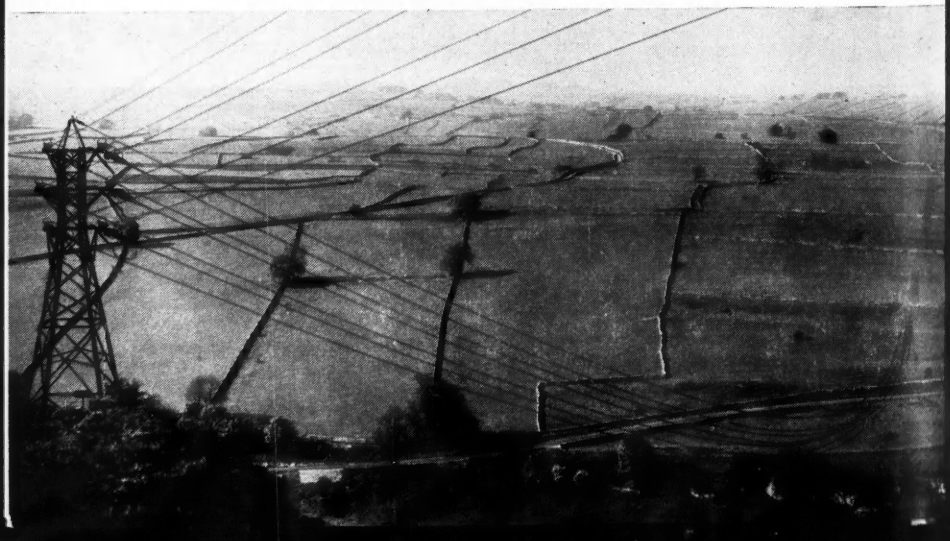
In estimating various values for the above domestic load analysis table we became involved in considerations related to the problems which faced the Board, in co-ordinating tariffs inherited from former undertakings. Long before vesting date tariffs had been standardized by the Midland Counties group of companies, whose total area was almost half of that now administered by the Board, but each of the remaining 29 undertakings had its own tariff schedule in operation when the Electricity Act, 1947, was passed. Certain similarities of tariff structure did exist, such as the rateable value percentage or the floor area as a basis for the fixed charge of domestic and commercial two-part tariffs, but the details varied fairly widely. Further, there were block tariffs related to rateable value and others with a fixed quota of high-priced kWh irrespective of the location or size of the premises.

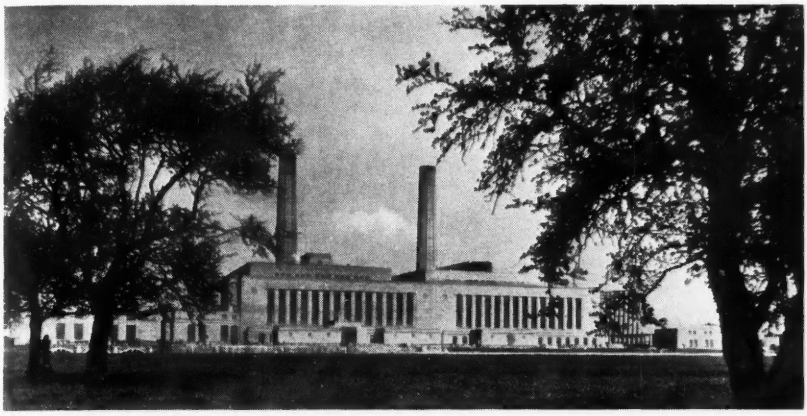
There were seven different running charges per kWh in these combined tariffs, the price varying from 0.5d to 1.5d. Further, some undertakings adjusted the running charge according to the apparatus installed, while others offered low off-peak rates under certain conditions. Flat rate tariffs for lighting in certain localities were as high as 8d per kWh and in some city areas as low as 3.5d per kWh. On the industrial side the price per kW or kVA of maximum demand varied considerably with the further complications of a monthly, quarterly or annual (retrospective or progressive) basis. Coal clauses in industrial agreements differed widely in the basic cost of fuel, and increments were applied at differing increases in the cost of coal.

With a total installed generating capacity of 1,006.27 MW the Area takes fifth place for total capacity among the fourteen Areas. Sixteen stations are at present operated by the Division of which North Wilford, Nottingham, with an effective capacity of 191 MW, is the largest. The second station in order of effective capacity is Spondon with 161 MW of plant, the Coventry station at Longford coming third with 121 MW, whilst Freemen's Meadow, Leicester, takes fourth place with a present effective capacity of 105 MW.

These four stations, the only ones above the 100 MW mark, represent 64 per cent of the total effective capacity of the Division. There are only two stations with capacities below one MW, and these are the only non-steam stations. Nine of the stations, including the new one at Staythorpe, near Newark, and North Wilford use river water for condensing purposes, and Longford is included in

The 1,500ft. Miller's Dale transmission line span, crossing railway, road and river





The new Staythorpe generating station is still under construction; its second set was recently commissioned

those stations which are dependent on cooling towers. Extensions are proceeding rapidly at Staythorpe where the second 60 MW set has just been put into service; North Wilford (52.5 MW) and Freemen's Meadow (31.5 MW) are also expected for next winter load, whilst the 30 MW extension at Hardingstone is scheduled for next year.

We present the accompanying schedule of generating stations in the Division as a ready means of conveying an overall picture of the position. During the year ended 31st March, 1950, 3,301.9 million kWh was generated by the Division and the generated m.d. ("sent out") was 749.2 MW.

The following are the principal substations on the major transmission system, with their transformer capacities in MVA:—Lincoln (30), Bourne (90), Corby (60), Leicester (60), Loughborough (30), Nottingham (150), Spondon (60), Burton-upon-Trent (30), Coventry (150), Warwick (60), Northampton (30) and Staythorpe (120) (under construction).

A speculation on at least the immediate future is a very justifiable and indeed

GENERATING STATIONS OPERATED BY THE EAST MIDLANDS DIVISION.

Station	Previous Owners	Type (steam and/or oil, etc.)	No. of shifts operated per day on normal winter basis	Total installed plant capacity MW	Effective main generator output MW s.o.
North Wilford	Nottingham Corporation	Steam	3	201.5	191.0
Spondon	Derby and Notts. E.P. Co.	Steam	3	172.0	161.0
Longford	Coventry Corporation	Steam	2	130.75	121.0
Freemen's Meadow ...	Leicester Corporation	Steam	3	120.75	105.0
Hardingstone Junc. ...	Northampton E.L. & P. Co.	Steam	2	88.5	82.0
Full Street	Derby Corporation	Steam	2	65.5	62.0
Staythorpe	New Station (under construction)	Steam	3	120	78.0 *
St. Swithin's	Lincoln Corporation	Steam	2	50.0	48.0
Avon	Leicester & Warwick Power Co.	Steam	2	48.0	43.0
Burton	Burton Corporation	Steam	3	45.0	42.0
Kettering	Kettering Borough Council...	Steam	2	7.0	6.0
Nutts Lane	Leicester & Warwick Power Co.	Steam	2	6.0	6.0
Chesterfield	Chesterfield Corporation	Steam	2	5.5	5.0
Loughborough	Loughborough Corporation	Steam	2	4.5	4.0
East Retford	East Retford Corporation	Oil/gas	1	0.87	0.855
Sleaford	Sleaford U. D.C.	Oil	1	0.4	0.392
				1,066.27	955.247

* Three boilers only in service.

Noted for the crooked spire of its church, Chesterfield represents a notable iron-smelting centre

helpful thing in such an assessment. If the National Coal Board implements its published policy of increased mechanization, which will necessitate the further gradual electrification of collieries, the small pit-head generating stations will become inadequate and more collieries will have to depend on public supply, and this must considerably increase the load in the Area. The rate of replacement of private by public supply should be accelerated as the plant position improves and continuity of supply is assured.

Apart from the load which will accrue on the domestic side from new housing estates, increased consumption by existing consumers may be expected when the punitive purchase tax on a number of domestic appliances is removed. The long overdue replacement of obsolete domestic apparatus and the purchase of new appliances will be further increased by the completion of credit sales schemes under which payments may be spread over a period of years.

Farms are at present being connected at the rate of 800 per annum, and this rate should soon be more than doubled. There are still as many as 17,000 farms in the Area to be connected. Schemes have already been prepared and approved to make supplies available over an area of 70 sq miles which will include 39 villages and hamlets in Lincolnshire previously without a supply.

We are indebted to Mr. King and Mr. Burge, and to their principal officers, for their co-operation in this final contribution to our National Supply Survey.

Power Additions in Ontario

IN the past few weeks three hydro-electric schemes have been put into operation in Ontario. The largest is the Des Joachims development on the Ottawa River, which adds 120,000 h.p. to the system capacity, with a further 240,000 h.p. scheduled before the end of the year. The Tunnel Gorge plant, near Thessalon, which was started up on 14th June by the Premier of Ontario, has a capacity of 56,600 h.p., and serves the nickel and gold mines. The third plant, at Pine Portage, on the Nipigon River, has an initial capacity of 40,000 h.p., to be increased later to 80,000 h.p.

I.E.C. Technical Committees

Report on Paris Meetings

By J. F. STANLEY, B.Sc., A.C.G.I., M.I.E.E.

MEETINGS of the Committee of Action and several Technical Committees of the International Electrotechnical Commission were held in Paris from 10th to 21st July inclusive. About 300 delegates from 16 countries attended; the largest national delegation was that from the United Kingdom, consisting of 51 delegates. The arrangements were admirably organized by the French Electrotechnical Committee.

The I.E.C. is an affiliated body of the International Organization for Standardization (I.S.O.) with full technical and financial autonomy and it constitutes the Electrical Division of the I.S.O. As such it has consultative status (Category B) with the Economic and Social Council of the United Nations.

Objects of the I.E.C.

The object of the I.E.C. is to facilitate the co-ordination and unification of national electrotechnical standards not already covered by the statutes of any other recognized international organization. The technical work is carried out by International Technical Committees, numbering at present 36, each with a clearly defined scope. These committees meet from time to time for the purpose of drafting recommendations expressing as nearly as possible an international consensus of opinion on the subjects dealt with. After they have been ratified by a majority of not less than four-fifths of the I.E.C. membership, the texts agreed upon by the Technical Committees are issued as official I.E.C. recommendations.

Twenty-three nations are now represented in the I.E.C. through permanent National Committees composed of representatives of all interests concerned in their respective countries. The British National Committee is the Electrical Industry Standards Committee of the British Standards Institution.

The Committee of Action, under the chairmanship of the President of the I.E.C., Dr. Schiesser (Switzerland), met on 21st July to receive reports from the Advisory Committees. One of the decisions taken by the Committee of Action was that these committees shall in future be known as Technical Committees.

The official minutes of the meetings of the Technical Committees have not yet been issued, but they will in due course be referred to the appropriate Committees of the B.S.I. for consideration and action. In the meantime the following brief notes will be of general interest.

Graphical Symbols

As Technical Committee No. 3, Graphical Symbols, had not met since 1939 some difficulties arose due to the change of views of the various National Committees which in some cases have been forced to issue their own national standards. This inevitably made it more difficult to obtain international agreement, especially as one country had found it necessary to use standards departing considerably from symbols agreed and used internationally up to 1939.

One solution proposed was that alternative symbols should be shown, but the British delegation objected to this because such a course must inevitably weaken the I.E.C. Standard. This was ultimately accepted in principle provided that some way could be found to show the symbols of the other country where they differed from the I.E.C. symbols; one way of achieving this would be to have an Appendix to Publication 35—Graphical Symbols for General Electrical Purposes. A committee was appointed to examine this and other problems, and work will proceed by correspondence and meetings when necessary during the next twelve months, so as to be ready to report to the Committee's next main meeting.

The problems before No. 7 Committee —Aluminium—concerned mainly the use of aluminium for overhead conductors, in the form of pure aluminium wires stranded round a steel core or an all-aluminium alloy cable.

General agreement was reached on a resistivity figure of 0.0284 ohm per mm^2/m at 20 deg C for hard-drawn aluminium wire and 0.0278 ohm per mm^2/m for soft aluminium wire. The National Committees will be asked to endorse these figures as an international standard.

The Committee also considered the mechanical properties of galvanized steel wire for aluminium steel-cored cables. Some countries use hot galvanized wire without any further cold drawing work, while other countries (including the United Kingdom) draw down the wire after galvanizing. The tensile strength, fatigue, elongation and other mechanical properties will vary according to the method of manufacture, and it was therefore decided to draw up two specifications, one for "hot" galvanized and the other for "drawn" galvanized wire.

During a discussion on the problems of corrosion between steel and aluminium, it was shown that in many countries the use of grease, or even oil, on the steel core has proved more effective than bitumen. In the U.S.A. the practice is to use heavy zinc coatings without any further treatment. Other problems concerned the use of aluminium for insulated cables, the resistivity of aluminium busbars, the use of super-purity aluminium and the question of the strength of joints.

Radio Communication

The work of the Radio Communication Committee (No. 12) is divided between four sub-committees dealing respectively with safety requirements, valves, components and measurements.

The sub-committee on safety requirements made good progress on the completion of safety rules for radio and television receivers. The sub-committee on valves did not make as much progress as had been hoped, mainly because of the restricted time available, and the sub-committees were not able to meet simultaneously. The British delegation proposed that the sub-committee on valves should become a full technical committee. For various reasons, however, this proposal was not accepted, but it was agreed that this sub-committee should meet independently of the others.

The sub-committee on components reached agreement on a colour code for fixed resistors and a series of preferred values to be used for resistors and the smaller capacitors. The decisions reached are very nearly identical with present practice in the United Kingdom. The sub-committee agreed on the great value of an internationally accepted standard for climatic and durability test procedure for radio components and a draft layout of such a standard with the type of test to be included was accepted. The delegates also agreed in principle the procedure for preparing standards for components for radio communication.

The sub-committee on measurements is a new one set up to examine the possibilities of standardizing methods of radio receiver measurement. There is no intention of establishing desirable limits for receiver performance. It started its discussions by detailed consideration of a document entitled "Standardization of Measurement on Receivers for Amplitude Modulation Broadcast Transmissions" drawn up by the Secretariat. The basis of this document was largely a Danish specification on the same subject. The whole field could not be covered in the time allotted, but a substantial measure of agreement was reached in the specification of measurement for those characteristics which were discussed. The document is to be re-drafted and circulated. The question of artificial aerial circuits is one which merits close attention. For future activity the scope of the sub-committee was defined in terms which received the support of the main Committee. The measuring conditions for television receiving apparatus and amplifiers for domestic use are included.

Switchgear

Forty delegates attended the meeting of Committee No. 17, Switchgear. The discussion centred mainly around Chapter 1, Rules for Short-Circuit Conditions, of I.E.C. Publication 56, Oil-immersed Circuit-breakers. Amongst the more important items discussed were (a) the nomenclature and specification of restriking voltage and recovery voltage phenomena, including methods of measure-

ment, and (b) test duties, in particular the values of voltage and short-circuit current at which tests shall be made.

The decision was taken to adopt the terms "restriking voltage" and "recovery voltage" in the sense in which they are used in this country (cf.B.S.116). The test duties specified will also follow the existing I.E.C. specification and B.S.116 with the addition of tests for critical current if the circuit-breaker exhibits a marked increase in arc duration during the tests. The voltage at which tests shall be made is likely to be the maximum or highest system voltage as prescribed in the proposals of I.E.C. Technical Committee No. 8, Standard Voltages.

A further meeting will be held in 1951 to complete the clauses of Chapter 1 and to consider four other chapters which will eventually form part of this specification —namely, those dealing with normal load conditions, insulation, selection and maintenance of circuit-breakers.

Electrical Accessories

Committee No. 23, Electrical Accessories, has reached agreement on the colour and position of push buttons, and colour of indicating lamps, for switch and control gear. It has also accepted proposals likely to lead to international standardization of a 10 A appliance connector. Work was undertaken on the standardization of the plugs and sockets and miniature and domestic fuses. Unfortunately it has not been possible to agree to one type and series only, and three groups of standards have been accepted for publication, i.e., American, British and European. There has been much useful interchange of information, particularly in respect of breaking capacity of fuses and prospective fault currents.

The main business of Committee No. 24, Electric and Magnetic Magnitudes and Units, was with certain issues concerning the M.K.S. Giorgi system upon which decisions had been deferred from the Torquay meeting of 1938 and to which the various National Committees had given consideration in the interval. The Committee confirmed the adoption of the name "Newton" to designate the unit of force in the Giorgi system. The Committee resolved to recommend the adoption of "total" rationalization for the Giorgi system and of the ampere as the fourth principal unit of the system.

In 1939 the U.S. National Committee undertook the duty of preparing a final report on Letter Symbols, but the work was interrupted until 1945. In 1946 the draft list of letter symbols was printed and circulated to the National Committees. This document, which served as the basis of discussion at the meeting of Committee No. 25, was reviewed in the light of comments which had been received, and a revised version of the list of symbols will be circulated to the National Committees for approval under the six-months rule.

Fuses and Capacitors

Committee No. 32, Fuses, discussed a draft specification for fuses which had been prepared by a sub-committee of experts. After a useful exchange of information, the sub-committee was asked to prepare additional proposals and to reconsider some of its original proposals in the light of the discussion. The Committee also considered proposals for standard characteristics for fuses (voltage, current, breaking capacity, ratings, etc.). An agreement in general being reached, the document was referred to an editing sub-committee. A request was made for the formation of a committee to co-ordinate the requirements for clearance and creepage distance for different insulating materials, between metal at different potentials, and for a committee to draw up rules for testing temperature rise and establishing safe limits for various materials.

Committee No. 33, Capacitors, is engaged in preparing international recommendations covering the performance of capacitors connected to power-frequency systems. The problems considered were concerned mainly with selection between different test methods adopted in the various countries to ensure adequate electric strength in the capacitor dielectric and terminals, and maintenance of this strength under working conditions.

The work of the Committee is not yet complete, but one major decision on which agreement was reached is the replacement of a specified maximum working temperature by a "stability test" involving operation at 135 per cent of rated power in an ambient temperature of 35 deg C for

a minimum period of 48 hours, with loss angle measurements at intervals to ensure that the dielectric is thermally stable.

Lamps and Lampholders

Committee No. 34, Lamps, Lamp Caps and Holders, met for the first time, although two sub-committees have been holding meetings during the last few years. Good progress was made in the drafting of international recommendations regarding a specification for tungsten filament lamps for general lighting service and the first edition of the specification was adopted for circulation to the National Committees for approval under the six-months rule. A committee of experts will study a number of outstanding points with a view to possible revision of the specification in a year or two.

A specification for lamp caps and holders was also agreed and submitted to the Committee of Action for publication. Before publication can take place, however, a clean draft will have to be prepared by an editing committee.

Good progress was made at the first meeting of Committee No. 35, Dry-Cell Batteries, in an attempt to draw up international recommendations covering definitions, sizes and quality. The Committee confined itself to a consideration of dry cells using manganese dioxide as a depolarizer, although inert and wet cells of this and other types may be studied later.

Although the original emphasis was on batteries for radio receivers, the Committee, after agreeing upon definitions, was able to draw up a list of cells and batteries for all purposes which will be standardized as regards dimensions. Preliminary interchange of views on testing methods has shown that agreement on this point at future meetings should not be unduly difficult.

Radio Interference

In addition to the meetings of the Technical Committees, a meeting of the International Special Committee on Radio Interference (C.I.S.P.R.) was held. This Committee, which operates under the ægis of the I.E.C., is composed of representatives of a number of international organizations. Its work is mainly concerned with the standardization of an instrument to be used for the measurement of radio interference. This work has been in progress for several years, and the Belgian Electrotechnical Committee has done extremely valuable work in the designing of a suitable instrument. The C.I.S.P.R. reached the conclusion that it was not practicable to standardize an instrument in minute construction detail, and attention is therefore being concentrated on the drafting of a specification for the performance of an instrument, it being hoped that experience will show that instruments complying with the performance specification will give reasonably consistent results.

Preliminary discussion also took place regarding permissible limits of interference voltage at the terminals of appliances and of interference field strengths. The reception conditions in the various countries vary so considerably as regards signal strength that widely differing views were expressed regarding the permissible limits of interference. Nevertheless, a figure of 1,500 microvolts at the terminals of the interfering appliances was tentatively agreed upon as a basis for further consideration. This figure relates to the protection of the long and medium wave broadcast programmes. Some countries, in particular the United Kingdom and the U.S.A., stressed the importance of reaching agreement with regard to the protection of television programmes and this matter remains on the agenda for future consideration.

Receptions and Visits

Arrangements were made by the French Electrotechnical Committee for the delegates to visit the Central Laboratory of the French Electrical Industries, the testing station of Electricité de France and the Television Centre.

Two dinners, one given by the Syndicat général de la Construction Electrique, at the Eiffel Tower Restaurant, and the other given by the French Electrotechnical Committee, at the Cercle Interallié, brought together in delightful surroundings the delegates and a large number of their French hosts. Excursions were arranged to Versailles and Fontainebleau and at the conclusion of the meeting a two-day tour in the Alps and Jura regions made it possible for a number of delegates to visit several power plants including the Genissiat hydro-electric station.

Commerce and Industry

British Industries Fair
Large Orders for Export

THE organizers of the British Industries Fair (30th April to 11th May, 1951) announce that applications for space have reached record proportions. The closing date for applications is 19th August, and every effort will be made to satisfy all requests received by then, although the size of individual stands may have to be limited.

The London Sections are organized by the Board of Trade, Lacon House, Theobald's Road, London, W.C.1, and the Birmingham Section by the Birmingham Chamber of Commerce, 95, New Street, Birmingham, 2.

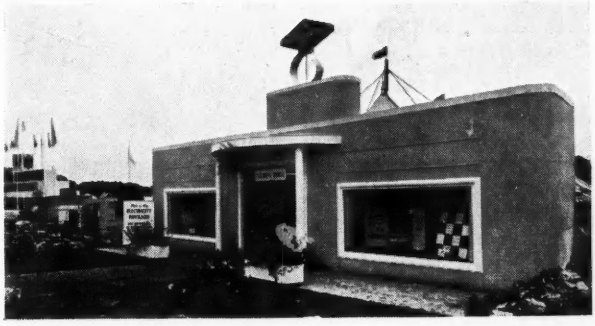
Glass Textile Association

The first general meeting of the Glass Textile Association, Ltd., held in Manchester recently, was attended by the founder members representing various sections of the industry, which include the following: Glass-yarn manufacturers; weavers, braiders and other glass-textile manufacturers; and others having a direct interest in these yarns and fabrics such as wire coverers, fabric proofers, etc. Mr. F. Marsden, of Frederick Marsden, Ltd., was elected the first president of the Association. The secretary is Mr. N. Pearson, of March, Pearson and Green, 1, Dickinson Street West, Manchester, 2, to whom applications for membership should be addressed.

Royal Lancashire Show

Lord Derby was one of the visitors who attended the North Western Electricity Board's stand at the Royal Lancashire Show held at Smithills Hall, Bolton, from 2nd to 5th August. The Board, led by Sir Joseph Hallsworth (chairman) inspected the stand on the opening day. On the third day members of the Bolton Committee of the North Western Electricity Consultative Council, with the Council chairman, Ald. Wright Robinson, were visitors. The stand, which took the form of a roomy marquee fronted by a facia decorated in blue and white, covered the complete service given by electricity to the farmer.

Especially popular were two sections: "Modernize your kitchen in easy stages" and "Bring your farm up to date with Electricity." The first, by diagrams, equipment and illuminated signs, showed the farmer's wife how, by a planned introduction of cooker, water heater, refrigerator and washing machine, she could have a modern labour-saving kitchen on easy terms. By the same technique, in the other section, the farmer was shown the advantages of the milker, water heater, sterilizer and cooler. The Board's Royal Lancashire Show Committee under the chairmanship of Mr. E. G. Wardle, manager of No. 2 Sub-Area, in whose territory this year the show was held, was responsible for the display.



The N.W.E.B. stand at the recent Royal Lancashire Show, Bolton

Transformers for India

The first two of a number of 20 MVA, three-phase, 100/6.6 kV Hackbridge transformers have just been shipped to India for installation at the Parel receiving station of the Tata Hydro-Electric Power Supply Co., Ltd., in Bombay. These units are to replace existing single-phase banks at Parel which have been in service since 1916. They will operate at the receiving end of a nominal 115 kV transmission system and are provided with h.v. tappings. As the existing transmission

system is on a lower voltage, the transformers are provided with a full capacity h.v. tapping for 85.8 kV on which they can be operated in parallel with the existing transformer banks, pending change-over to the higher voltage system. To meet climatic conditions the transformers are designed for a temperature rise of 40 deg C (oil) and 55 deg C (by resistance), and to have an impulse voltage level based on 550 kV and 95 kV, respectively, for the h.v. and l.v. windings, with a $1\frac{1}{2}/40$ microseconds full wave. Connected star/star, the transformers are equipped with a $33\frac{1}{3}$ per cent delta tertiary winding. Cooling is by means of a Serck horizontal water-cooled heat exchanger. The weight of each unit complete with oil is 55 tons.

B.B.C. Recording at Research Laboratories

A B.B.C. mobile recording unit recently visited the Wood Lane Research Laboratories of British Insulated Callender's Cables, Ltd., to record details and impressions of B.I.C.C.'s new surge generator for "Radio Newsreel." The interviews were conducted by Mr. Valentine Selsey, the B.B.C. reporter, whilst Mr. Shelton-Williams supervised the actual recording. Mr. P. R. Hartshorn, who is in charge of high-voltage testing in the laboratory where the surge generator tests are carried out, was interviewed first and briefly stated the purpose of surge-testing cables and accessories. He was followed by Mr. W. G. Hawley, the high-voltage research manager, who described for listeners some interesting features of the new generator. Also included in the recording was a demonstration flashover, for which use was made of a string of fourteen glass suspension insulators, the flashover occurring at 1,250,000 V.

Switchgear Contracts

Among overseas contracts recently received by Ferguson Pailin, Ltd., are two large orders secured in the face of foreign competition. The first of these comprises a total of forty-four heavy metalclad switchgear units having a rating of 750 MVA at 22 kV, and eighty-one smaller metalclad units having a rating of 250 MVA at 6.6 kV. The circuit-breaker equipments are electrically operated and equipped for remote supervisory control. They will be installed at various substations on the system of the Athens Piræus Electricity Co., Ltd. The work has been recognized as an important factor in the Greek economy, and the finance has been secured under the European Recovery Programme.

The other contract, which has been secured through the company's agents, Associated Electrical Industries (India), Ltd., Calcutta, covers twenty-three outdoor oil circuit-breakers for the 132 kV system of the Damodar Valley Corporation. These breakers are to have an interrupting capacity of 2,500 MVA and they will be pneumatically operated. They are for installation at various substations in the Bihar region of India.

Nottingham Refresher Course

A refresher course for works and plant engineers is to be conducted in the Great Hall of the University of Nottingham. The series of papers, by specialists drawn from industry, will be presented weekly on Monday evenings for a period of twenty-three weeks, commencing in October next. The course has been organized by a committee, under the chairmanship of Mr. E.G. Phillips, which includes the regional chairmen of the Institutions of Mechanical and Electrical Engineers, the Institute of Fuel, the Institution of Heating and Ventilating Engineers and the Institution of Plant Engineers, in collaboration with the Regional Advisory Council for Further Education, the Ministry of Fuel and Power, the University of Nottingham, the Nottingham and District Technical College and the East Midlands Kindred Engineering Societies. The syllabus is designed not only to increase knowledge but to make more effective use of existing knowledge, and to promote the application of advanced techniques in works engineering practice over a wide field. The fee for the full twenty-three weeks' course will be £3 3s, and particulars can be obtained from the secretary, Mr. P. Bailey, Ministry of Fuel and Power, Chalfont Drive, Nottingham.

P.O.A. Conference

The National Conference of the Purchasing Officers' Association is this year being held under the presidency of Mr. T. F. Turner (chief purchasing agent, English Electric Co., Ltd.) at the Hotel Metropole, Brighton, from 28th September to 1st October. Among the speakers will be Mr. R. Harrod, whose topic will be "Sterling and the Buyer," and the Hon. John Grimston, M.P., who will discuss the implications of Government bulk buying. Two sectional meetings are included in the programme at which leading trade speakers will deal with the future supply and price trends of rubber and timber. The social side of the conference will include a civic reception at the Royal Pavilion, a dinner-dance, a ladies' fashion show and motor coach tour, and golf and bowls tournaments for the "Sir John Nicholson" and "Sir George Kenning" trophies. A conference innovation is the staging of a P.O.A. "Minibition" in the hotel rooms and corridors adjacent to

the conference meeting rooms. This miniature exhibition is intended as an educational feature of the conference, and the hundred stands will cover almost the entire range of British industry.

E.D.A. Films

One of the Electrical Development Association's educational films, "Electro-Chemistry," has been awarded first prize in Section B, Scientific Films (Chemistry) at the International Film Festival now taking place at Venice. Another of the E.D.A. educational films, "What is Electricity?" was among the forty-nine British films presented at the Venice Film Festival.

Three of the E.D.A. series of educational films have been selected for showing at the Film Festival in connection with the International Festival of Music and Drama, to be held at Edinburgh from 20th August to 9th September.

Canadian Professors' G.E.C. Visit

On 24th July, after a visit to Birmingham University, eleven professors representing Canadian universities having engineering faculties inspected the General Electric Co.'s apprentices' hostel at Castle Bromwich, and were received by Mr. J. J. Gracie, general manager of the Witton Engineering Works. After a tour of the hostel, the visitors were entertained to tea. The day's activities formed part of a comprehensive tour arranged to enable senior officials to study post-graduate courses in certain universities and to examine research facilities. The programme includes visits to engineering factories and power stations.

Engineering Education

Details of engineering education in the London and Home Counties Region are contained in a 15-page booklet issued by the Regional Advisory Council for Higher Technological Education in collaboration with the Engineering and Allied Employers' (London and District) Association. General information is given on the various types of course available, such as for engineering crafts, National Certificates and so on, for students from the time they leave school, together with an outline of the facilities available for students who are qualified to follow courses for university degrees and research. There is also a list of the colleges in the region concerned with courses offered during the session 1949-50, which will be a useful guide to present and future facilities. Copies of the publication are available, price 1s, from the Council at 20, Fitzroy Square, London, W.1.

School Lighting

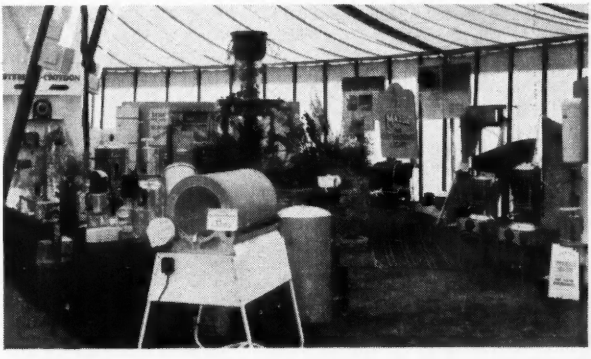
A new memorandum on "Fluorescent Lighting in Schools," has just been published by the Lighting Service Bureau, 2, Savoy Hill, London, W.C.2. This deals with the characteristics of fluorescent lamps, the use of artificial lighting, and the cost of fluorescent lighting, and concludes with the statement that there is no evidence that the frequency of occurrence of eyestrain is any greater with fluorescent than with other kinds of artificial lighting. Copies of the memorandum (a limited edition) can be obtained free of charge on application to the Bureau.

British Food Fair

On the E.D.A. stand at the British Food Fair, which is to be held from 29th August to 9th September, demonstrations will be given of modern cooking equipment and cookery films will be shown. The Association is erecting on its stand a reproduction of the "cooking laboratory" of Mr. Philip Harben, the B.B.C.'s senior television chef.

Co-operation at Taunton

The accompanying picture shows an electrical group stand at the Taunton Industries Fair, which was held from 5th to 12th August. The display was arranged by local electrical contractors and the South Western



The joint exhibit of the South Western Electricity Board and local contractors at the Taunton Industries Fair

Electricity Board, and was the first joint exhibit of its kind in the South Western Area.

Trade Announcements

A new depot is being opened on 1st September by **Cryselco, Ltd.,** at 34-40, Bath Street, Sneinton Market, Nottingham.

W. G. Walker & Co. (Engineers), Ltd., have been appointed British agents for A/S Atlas Maskinfabrik, of Copenhagen, for their Glacia cooling plants.

The Cardiff office of the **Simplex Electric Co., Ltd.,** is now 11, Womanby Street, Cardiff (telephone: Cardiff 2041).

H. Fisher (Oldham), Ltd., have recently moved from Glodwick Road to their new works at Pennant Street, Oldham, Lancs.

Catalogues Wanted

Mortimer, Gall & Co., Ltd., 115/117, Cannon Street, London, E.C.4, ask for catalogues, etc., from manufacturers of equipment for lighting, space and water-heating, and ventilation, as well as domestic appliances and l.v. switch and distribution gear.

Small Motors for Argentina

A shipment of over 1,000 fractional horse-power motors of various sizes is now being made to Argentina by Small Electric Motors, Ltd., Beckenham, Kent. The order is said to have been obtained against strong foreign competition.

Scientific Instrument Research Association

The Library and Information Department of the British Scientific Instrument Research Association is being transferred to Chislehurst, and correspondence should now be addressed to the Information Department of the Association at "Sira," Southill, Elmstead Woods, Chislehurst, Kent (telephone: Imperial 2237).

Trade with the Philippines

Despite preferential treatment accorded to United States goods imports into the Philippines of British-made electrical goods and apparatus rose from £340 in 1947 to £4,666 in 1948, machinery (including electrical machinery) imports from the U.K. rising in value from £134,745 to £210,015. This represents, however, only a small portion of the country's imports of electrical machinery and appliances which were valued at 32 million pesos (2 pesos=U.S. dollar) in 1947 and 35 million pesos in 1948. Further details of the commercial conditions in the country are given in a Board of Trade review (H.M. Stationery Office, 6d).

What Rearmament Means

Yesterday (Thursday) Mr. Hugh Gaitskell, Minister of State for Economic Affairs, was to meet representatives of the Federation of British Industries, the British Employers' Confederation and the Trades Union Congress. His purpose was to explain the probable effects of the rearmament programme upon industry generally and upon the national economy. It was expected that Mr. Gaitskell would deal with the use of factory space, the possibilities of increased productivity and the allocation of labour.

A New Zealand Order

Following the contract for 220 kV transformers which Ferranti, Ltd., recently received from the new Roxborough power station, New Zealand, the company has now received a second large order from the State Hydro-Electric Department, New Zealand, for thirteen additional 9,259 kVA, single-phase type OFW generator transformers to form four 27,777 kVA 3-phase banks, ratio 11-220 kV, with one single-phase unit as spare. These transformers will be installed at the new station at Whakamaru, North Island.

Trade Unionists in Russia

The delegation of seven members of the Electrical Trades Union, led by the president, Mr. Frank Foulkes, which has been on a visit to Russia spent three days in Zaporozhye. Among the places seen were the Dnieper Lenin hydro-electric station, reconstructed after the war, a collective farm, and industries using power from the Dnieper station. The visitors were the guests of local trade unionists at a lunch on 8th August.

Catalogues and Lists

Kelvin-Norton Electric Co., Ltd., Safetex Works, Barbauld Street, Warrington, Lancs. —Descriptive brochure and parts price list of the K.N.E. "safety first" overhead grid low voltage inspection lamp system.

Sloan Electrical Co., Ltd., 41, Kingsway, London, W.C.2.—Priced folder dealing with "Gulf" oil-filled electric radiators.

Londex, Ltd., Anerley Works, 207, Anerley Road, London, S.E.20.—Three priced technical leaflets on synchronous process timers.

Ionlite, Ltd., 89, Scrubs Lane, London, N.W.10.—Two folders on cold cathode lighting equipment and another describing a colour matching unit.

CONDITIONS IN SOUTH AFRICA

Electricity Supply Commission's Report

THE main theme of the latest annual report of the Electricity Supply Commission of South Africa, whose chairman, Mr. A. M. Jacobs, M.A., attended the recent World Power Conference in London, is "progress despite difficulties." The report says that in the present state of national and international finance it is necessary that development should be confined to essentials. Thus "financial stringency" is given as the reason for not proceeding with the building of transmission lines totalling 190 miles.

The Commission's construction programme is, nevertheless, one of considerable magnitude. Its scope may be gleaned from the fact that to date capital expenditure amounts to £50.1 million, whereas on completion of the present programme it will be in the neighbourhood of £104.1 million. In considering this proposed expenditure of £54 million, the report points to the present high costs of constructing and equipping new power stations. For example, when the Klip station, with a capacity of 424,000 kW, was completed in 1940 the cost averaged £15.4 per kW. Against this, the 106,000 kW installed at the Vaal station by 1945, including construction work, cost £30 per kW, while it is estimated that the 150,000 kW to be installed at Vierfontein by 1955 will cost £55 per kW. Besides the higher cost, the report complains that the rate of deliveries is still slow.

PLANT BEING INSTALLED OR ON ORDER

Name of Station	Boilers 1,000 lb/hr	Generators MW
Colenso	3 × 180	1 × 25
Congella	3 × 200	1 × 40
East London (Westbank No. 1)	2 × 55	1 × 7.5
Hex River	4 × 200	3 × 20
Salt River No. 2	4 × 260	2 × 30
Umgeni	4 × 180	2 × 30
Vaal	9 × 190	4 × 33
	—	2 × 7
Vereeniging	1 × 180	—
Vierfontein	9 × 210	5 × 30
Witbank	2 × 80	1 × 20
Taaibos	2 × 580	2 × 60
On hand	—	2 × 6
Total	8,910	700.5

The report covers the calendar year 1949, with a brief review of activities up to 30th April, 1950. There were, at 31st December, 43 boilers totalling 8,910,000 lb/hr and 26 generators with an aggregate capacity of 700,500 kW in course of installation or on order, as shown in the accompanying table. The capacity of the Commission's stations at that time was 1,486,000 kW. The scheduled dates for the initial commissioning of new stations are: Hex River, Worcester, 1952; Umgeni, near Pinetown, 1953; Salt River No. 2, Cape Western system, 1954; and Taaibos, near Coalbrook, O.F.S., 1954. In addition the Commission plans to build new stations at Swartkops, about seven miles to the north of the Port Elizabeth municipal station, and at East London (Westbank No. 2).

Besides plant extensions, the Commission hopes to complete 200 miles of new 132 kV transmission lines by April next year, as well as more than 300 miles of 88 and 40 kV lines.

Last year a total of 7,075.3 million kWh was generated. Of the Commission's steam stations Vaal had the highest thermal efficiency (22.51 per cent; 1,039.1 million kWh sent out), followed by Congella Nos. 1 and 2 (20.55 per cent; 505.4 million kWh) and Klip (19.93 per cent; 2,653.5 million kWh). The price of coal used ranged from 3s 9d a ton of 2,000 lb at Witbank and 4s 7d at Klip to 29s 6d at Salt River.

Mining Requirements

Of the 6,222.2 million kWh sold more than half was supplied for mining purposes on the Rand, where in spite of voluntary economy at peak periods there has been a rapid increase in demand.

The Commission's revenue in 1949 amounted to £8,799,486, compared with £6,492,153 in the preceding year, the extent of this increase being due to the taking over of the Victoria Falls and Transvaal Power Co.'s undertakings in the Union on 1st July, 1948. Costs totalled £8,820,887 (against £6,425,105), leaving a deficit of £21,401 compared with the previous year's surplus of £67,048. The price per kWh sold averaged 0.303d (0.260d in 1948). The report emphasizes that the increasing costs will inevitably mean higher charges.

An appendix contains details of the production and supply of electricity in the Union based on the 1947-48 Industrial Census. Altogether 9,480.7 million kWh was generated and 8,089.2 million kWh sold. The 466,908 consumers included 390,381 domestic users whose average annual consumption was 3,230 kWh. The total installed capacity of the 316 power stations was 2,251,361 kW.

CANADIAN EXPORTS

Decline During 1949

THERE was a further decline in Canadian exports of electrical apparatus last year, when they were valued at $12,293,000, compared with $16,822,000 in 1948 and over $19 million in 1947. Last year's decreases occurred in shipments of storage batteries, plugs, magnetos, dynamos, motors, and telegraph and telephone apparatus. On the other hand, exports of receiving sets, transformers and meters increased. Figures of the important trade in electric stoves and other domestic heating and cooking devices have not yet been issued for 1949. Destinations of Canada's electrical manufactures were numerous and widespread, with Latin-American countries prominent among them. Some leading items are shown in the accompanying table.

Class of Equipment	1949 $(000)	Inc. or dec. on 1948 $(000)
Batteries, storage	863	− 897
To Indonesia	70	+ 50
„ *South Africa*	180	− 364
„ *India*	43	+ 32
„ *Malaya*	28	− 68
„ *Colombia*	28	− 49
„ *Venezuela*	186	+ 18
Batteries, other	442	− 20
To Malaya	195	− 68
„ *Indonesia*	220	+ 84
Radio receiving sets	1,427	+ 534
To Venezuela	402	+ 262
„ *Philippines*	150	+ 148
„ *South Africa*	111	− 70
Radio apparatus, other	1,539	− 2
To United Kingdom	133	+ 80
„ *Australia*	124	+ 124
„ *Sweden*	233	+ 210
Dynamos, generators and parts	930	− 82
To New Zealand	33	− 137
„ *India*	117	+ 93
„ *Australia*	16	− 29
„ *Brazil*	626	+ 144
„ *Indonesia*	11	+ 7
Telegraph and telephone apparatus	94	− 230
To Brazil	22	− 56
„ *Bermuda*	11	+ 8
„ *Cuba*	14	+ 7
Motors and parts	1,904	− 1,003
To Australia	399	− 134
„ *New Zealand*	305	− 99
„ *Venezuela*	55	− 168
„ *Brazil*	78	− 223
„ *United Kingdom*	53	− 41
Transformers and parts	976	+ 587
To New Zealand	33	+ 33
„ *Colombia*	29	+ 29
„ *India*	117	+ 117
„ *Brazil*	626	+ 617
Meters and parts	2,369	+ 741
To Brazil	329	+ 224
„ *Chile*	286	+ 74
„ *Colombia*	134	+ 50
„ *Cuba*	306	+ 78
„ *Mexico*	719	+ 483
„ *Venezuela*	164	+ 11
Spark plugs, magnetos, etc.	544	− 675
To Australia	26	− 61
„ *South Africa*	189	− 166
„ *New Zealand*	37	+ 24
„ *India*	37	− 35
„ *Ceylon*	22	+ 3
„ *Brazil*		
„ *Mexico*	63	− 86
Electrical apparatus, n.o.p.	842	− 167

NORWEGIAN IMPORT TRADE

THE total value of Norway's electrical imports last year increased by about 20 per cent on 1948. The rise in cable of 40mm dia and over, motors, generators and automatic telephone equipment was marked.

The only substantial decreases in imports were in radio goods and light wire. Britain improved her position as supplier and did over 25 per cent of the trade. Denmark came next with about 17 per cent, overtaking Sweden, which was second largest supplier in 1948. The United States, Holland, France, Switzerland and Belgium also shared in the trade, the principal lines of which in 1949 are shown in the following table, with notes of increases or decreases on 1948. [The exchange value of the Norwegian krone is approximately 1s.]

Class of Equipment	1949 Kr. (000)	Inc. or dec. on 1948 Kr. (000)
Electric motors	31,240	+ 5,818
Generators	9,460	+ 2,008
Transformers	4,380	+ 614
Batteries and pts.	3,410	− 810
Accumulators and pts.	3,260	+ 630
Incandescent lamps	5,765	+ 365
Radio apparatus	725	− 4,530
Radio valves	3,480	− 600
Wireless, telegraphic, etc., material	5,030	− 544
Automatic telephone apparatus	4,910	+ 4,080
Lead covered cable up to 40 mm. diam.	8,214	+ 5,642
Ditto, 40 to 80 mm. diam.	6,084	+ 3,394
Ditto, over 80 mm.	130	+ 80
Other electrical wire	3,500	− 1,600
Vacuum cleaners	1,620	+ 430
Porcelain insulators, h.v.	2,905	+ 505
„ „ l.v.	2,420	+ 920

Guarding Machinery

Responsibilities of Employers and Employees

By F. E. SUGDEN, A.C.I.S., Barrister-at-Law

A GREAT deal of machinery employed in industry is dangerous unless guarded, and neglect to fence it is actionable at Common Law if an employee suffers injury as a consequence. Incidentally, the accident would not be covered by the National Insurance Act.

Thus the negligent owner of the machinery is not only liable to penalties for breach of statutory duty; he may also have to pay damages to the injured workman.

What is the legal position where a guard has been fixed to machinery but is put out of action by an employee who finds it inconvenient to work with the guard on, or for some other reason?

Recent Case

The best way to state the legal position is to quote the following recent case. A Factory Inspector laid information against a firm alleging that a dangerous machine in their factory was not properly fenced and that, accordingly, they had contravened the provisions of the Factories Act, 1937, Section 14, Sub-section 1. It was proved that the machine, a power press, was fitted with a guard which rendered it safe so long as the guard was in the "down" position, but, if the guard was in the "up" position, the machine became dangerous. An employee was operating the press with the guard in the "up" position when an accident occurred and he was injured. The employers contended that the employee was the actual offender and consequently they laid an information against him under Section 137, Sub-section 1.

At the hearing it was submitted by the employers that no offence had been committed under Section 14, Sub-section 1, because they had complied with that subsection by providing an adequate guard, and, therefore, the proceedings should have been brought under Section 16 which required that all fencing and other safeguards fitted to dangerous machinery must be maintained and kept constantly in position, except when any part of the machine was necessarily exposed for examination. The justices upheld the employers' submission and dismissed summonses against both the employer and employee.

The case went to the Court of Appeal, which held that the summons had been rightly issued under Section 14, Subsection 1, which imposed a duty on owners and occupiers of factories containing dangerous machinery to see that it was securely fenced at the material time, namely, the time when the accident occurred, whereas Section 16 did not create any new offence but merely defined the extent of the obligation and introduced exceptions from the provisions of Section 14, available as a defence to those within such exceptions.

Steps to Secure Compliance

What can the owner of machinery do to protect himself against the carelessness of employees when he has given specific instructions that a guard must always be used? In such circumstances he should warn the employee concerned, more than once, and then if he still persists in not using the guard there is no alternative but to dismiss him.

It also behoves the factory owner to have exhibited, in prominent places, copies of all the Factory Regulations applicable to machinery and a foreman or other responsible official should draw the attention of new employees, and even old ones periodically, to these regulations.

If, after several inspections, a Factory Inspector finds that the regulations are being complied with, he will only, in the future, make routine visits according to the nature of the work and the area he has to cover in the meantime. But if he finds, after two or three visits, that breaches of regulations have occurred, he will probably make surprise visits.

FINANCIAL SECTION

Company Notes and Stock Exchange Activities

REPORTS AND DIVIDENDS

Pye, Ltd.—Speaking at the annual meeting on 4th August, Mr. C. O. Stanley (chairman) said that 1949-50 far surpassed every previous year with a trading profit of nearly half a million pounds. Since the annual report was circulated it had become clear that a company like theirs would have to make considerable sacrifices in changing part of the production of both laboratories and factories over to work of a military character.

The Mirrlees Watson Co., Ltd.—In the course of his speech at the annual meeting held on 8th August, Mr. D. M. Semple (chairman and managing director) said that the demand for sugar machinery had continued to come from all their established markets. A new development was driving sugar mills by small steam turbines. The condensing and pump departments had been fully employed and condensing plants had been put into commission in Colenso, South Africa, and Rangoon, in Burma, and pumping plants in Calcutta and Kingston-on-Thames power stations. Their steam ejector air pump business continued on a satisfactory level, and there had been an increase in the number of orders for automatic coal stokers. Their Imo Pump Works at Hillington had been fully employed and a considerable volume of orders for large pumps had been booked.

The Sterling Cable Co., Ltd., reports a trading profit for the year ended 31st March last of £67,706, as compared with £90,461 for the preceding year, and after providing for depreciation, etc., there is a balance of £41,921 (against £61,484), to which is added £7,727 brought in, making £49,648 available. Taxation absorbs £21,646, and it is proposed to pay an ordinary dividend of 5 per cent (against 10 per cent) for the year, leaving £14,321 to be carried forward.

T. Clarke & Co., Ltd., report a trading profit for 1949 of £21,568, as compared with £23,547 for 1948, plus interest on war damage claim £543 and tax adjustment £513, making £22,624. After deducting taxation, depreciation, etc., there is a net balance of £6,362 (against £6,930), to which is added £6,152 brought in, making £12,514 available. The final ordinary dividend is 5 per cent, again making 10 per cent, tax free, for the year, and the balance carried forward is £4,823.

The Electric Furnace Co., Ltd., reports profits for the year to 31st March last, subject to final audit and after tax adjustments, of £26,171. The final dividend is 4½ per cent, making 8 per cent for the year (unchanged).

Chadburn's (Liverpool), Ltd., reports a profit for the year ended 31st March last of £9,674, as compared with £4,736 for the previous year. It is proposed to pay a dividend of 6 per cent for the year (against 3 per cent).

The Nico Light Engineering Co., Ltd., reports a net profit for the year to 31st March last of £9,776, as compared with £11,782 for the previous year. General reserve receives £3,000 and leasehold property depreciation reserve £2,759. It is proposed to pay a dividend for the year of 10 per cent and a bonus of 5 per cent (both same), and to carry forward £7,369 (against £7,827 brought in).

NEW COMPANIES

Johnson, Smith & Co., Ltd.—Registered 4th August. Capital £2,000. Electrical contractors, radio and television engineers, etc. Subscribers: Jean Herbert, company director, and Claire Moore. Regd. office: 349, Coldharbour Lane, S.W.9.

Northern Lights (Rentals), Ltd.—Registered 4th August. Capital £1,000. Radio and television renters, and renters of all electrical equipment, etc. Directors: C. R. Lyon, Peggy Lyon, F. R. Howell and D. J. R. Howell. Regd. office: 370, Cricklewood Lane, N.W.2.

A. E. Dean & Co. (X-ray Apparatus), Ltd.—Registered 8th August. Capital £50,000. Directors: G. P. Dean and Mrs. Eileen Dean. Regd. office: Progress Way, Waddon, Surrey.

Union Electrical Co. (Hull), Ltd.—Registered 5th August. Capital £500. Electricians, electrical and wiring contractors, electrical and general engineers, etc. Directors: B. Annis, M. Dubb and J. Slater. Regd. office: 31, Upper Union Street, Hull.

Batteries & Components, Ltd.—Registered 10th July. Capital £1,000. Electrical equipment specialists, etc. Directors: D. L. Hollands, I. P. Belcher, and E. T. Stokes. Regd. office: 30, Lomond Grove, Camberwell, S.E.5.

Lampton Trading Co., Ltd.—Registered 4th August. Capital £1,000. Manufacturers

and repairers of and dealers in electrical and mechanical apparatus and accessories, wireless and television sets, etc. Directors: F. Bridger and A. W. Arnott. Regd. office: 2a, Lampton Court, Lampton Road, Hounslow, Mdx.

Luminator-Britain, Ltd.—Registered 2nd August. Capital £100. Manufacturers of and dealers in lamps and lighting devices and equipment, etc. Directors: F. G. Maw and E. E. Maltby. Regd. office: 40/3, Norfolk Street, Strand, W.C.2.

Merrylight Electrical Co., Ltd.—Registered 2nd August. Capital £1,000. Subscribers: W. H. Wilcocks and Nellie Symes. Regd. office: Cliffords Inn, Fleet Street, E.C.4.

INCREASES OF CAPITAL

Brush Electrical Engineering Co., Ltd.—Increased by £1,170,000, in 370,000 unclassified shares of £1 and 3,200,000 ordinary shares of 5s, beyond the registered capital of £2,830,000.

Wessex Wholesale Electric, Ltd.—Increased by £70,000, in 55,000 ordinary and 15,000 5 per cent preference shares of £1, beyond the registered capital of £30,000.

Geo. Dandridge & Co., Ltd.—Increased by £24,900, in £1 ordinary shares, beyond the registered capital of £100.

L.E.S. Distributors, Ltd.—Increased by £45,000, in £1 unclassified shares, beyond the registered capital of £5,000.

BANKRUPTCIES

A. F. Guildford, 52, Mauldeth Road West, Withington, Manchester, electrical contractor.—Receiving order made 2nd August on debtor's own petition.

First meeting 18th August at 20, Byrom Street, Manchester. Public examination 20th October, at the Court House, Quay Street, Manchester.

A. H. Banwell, 4, Dominion Road, Fishponds, Bristol, electrical and radio retailer.—Public examination, adjourned *sine die*, to be proceeded with on 20th October at the Guildhall, Small Street, Bristol, 1.

G. Wilson, 28, Holmwood Drive, and formerly carrying on business at 1, Abney Street, Leicester, electrical engineer.—First meeting 11th August at 4, New Street, Leicester. Public examination 13th October at the Castle, Leicester.

LIQUIDATIONS

E. Clarke (Electrical), Ltd.—Winding up voluntarily. Liquidator, Mr. M. Naylor, of John Potter & Harrison, 22, Birley Street, Blackpool. Particulars of claims to the liquidator by 9th September.

Ministry of Works Report

IN the course of its report for 1949 the Ministry of Works analyses the firms and labour force engaged in the building trade. Under Defence Regulation 56AB it is necessary for firms to be registered by the Ministry; it is shown that at August, 1949, no fewer than 8,503 firms of electrical contractors were registered. There were also 922 firms of heating and ventilating enginers.

Tables show that at 1st August, 1949, the total number of electricians was 54,473; there were 15,358 apprentices of whom 4,913 joined during the preceding year. The appointment of the Apprenticeship & Training Council for the Electrical Contracting Industry was reported last year; its main task in 1949 was the preparation of a deed of apprenticeship for the industry and agreement was reached in principle on the form of the deed.

The publication of Codes of Practice continued during the year; the list now includes Codes on the lighting, heating and provision of hot water by electricity and gas.

The table shows the production of building "fitments" during 1949. The figures include electric cookers (233,800) against 634,000 gas cookers; electric wash boilers (112,900 — provisional figure) against 349,100 gas; 145,800 electric immersion heaters and 144,600 gas water heaters; and 1,237,400 electricity meters, against 1,266,900 gas meters.

In a section on Government buildings it is stated that a new substation has been built to provide better electrical services in the Houses of Parliament where the existing supply system is loaded to capacity. In the field of atomic energy good progress was made in the building of two atomic piles at the Production Establishment at Windscale, and at Harwell the largest cyclotron in Europe was completed. Another building completed at Harwell was the "Hot" Laboratories in which experimental work is carried out on radio-active materials. Several large wind tunnels are under construction at the National Aeronautical Establishment, Bedford and a new project is being constructed at the National Gas Turbine Establishment.

Contractors' Annual Dinner

It is announced that the next annual dinner of the Electrical Contractors' Association is to be held at Grosvenor House, London, W.1, on 30th January, 1951.

FINANCIAL SECTION

STOCKS and SHARES

THE saying goes round the Stock Exchange markets that "the worse the news the better the markets." Exaggerated as this may seem to be, it is, nevertheless, a fact that Stock Exchange prices stand up remarkably well to what would have been regarded, in days gone by, as serious developments on the part of an enemy. British Transport and British Electricity issues are sympathetically good with British Government stocks as a whole.

Electric and Musical Industries have risen sharply from a guinea to 23s 6d, the buying being very persistent and attributed in part, as usual, to American sources. Radio shares as a whole are better, E. K. Cole 17s 3d, and Cossor 9s 3d having improved by 1s 9d and 1s 3d respectively. Telephone Manufacturing 10s 6d, Brush 5s 9d, Oldham 5s 3d, and Laurence Scott 13s 9d, are all slightly better. Allen West rose 1s to 10s. On the other hand, Revo at 37s 6d are 2s 6d down. Telephone Condenser 32s 6d and Walsall Conduits 56s 3d are a little easier. Metal Industries are two guineas ex dividend. W. T. Henley's at 22s 6d are 6d lower. British Thermostat show a florin rise at 30s 9d; International Combustions at 16s 9d have risen 9d. Calcutta Electrics at 23s are 1s 6d to the good, and Calcutta Trams at 28s are 3s higher on the week.

Five Per Cent

International events have failed signally to bring out much cheap stock in the industrial markets, and, with many of the "blue chips" apparently well-rooted in a yield basis around the 4 per cent mark, it may serve a purpose to indicate a few electrical shares which are on offer to give the buyer something better on his money. Telephone Manufacturing at 10s and Enfield Cables at 30s pay exactly 5 per cent. Electric Constructions at 58s 6d give a fraction more, Johnson & Phillips at 60s 6d, Walsall Conduits at 57s, and Lancashire Dynamos at 92s, all a little less, than the round 5 per cent. In the higher ranges, Parmiter, Hope & Sugden 1s shares at 3s yield over 8 per cent on the 25 per cent dividend, shown by the recently published accounts to be well covered by earnings. Aron Meter at 40s, Hall Telephones at 14s and Aberdare Cables at 56s 6d return more than 7 per cent.

Murphy Introduction

Another well-known name has been introduced to the radio share market this week, when dealings began in the 5s ordinary shares of Murphy Radio on the basis of 7s to 7s 3d. Particulars published in connection with the introduction give an estimate that this year's profits will be not less than those of 1949, and, if this is realized, the intention is to maintain the dividend at the 10 per cent rate paid for the last two years. On this assumption, the indicated yield on the shares is approximately 7 per cent.

Miscellaneous Matters

The 5s shares of Venner Time Switches were quoted at 6s after the declaration of the 5 per cent dividend, and the announcement that the 1948 loss had been converted into a satisfactory profit. Previous markings in the shares were at a little under 6s last month. Electrical Components 5s ordinary stand at 11s 3d to yield 8¾ per cent on the recently declared dividend of 20 per cent: this is at the same annual rate as the 15 per cent paid for the previous nine months. The Sterling Cable Co., which has just published its annual results, is controlled by A. C. Cossor; the 4½ per cent preference are quoted at about 17s 6d.

Electricity Overseas

Palestine Electric Corporation's profits for 1949 are announced at practically treble the previous level, and provide comfortably for the maintenance of the dividend at 5 per cent tax free on increased capital. A free share bonus of one in six was distributed in February. Further shares issued for cash in April at £1 do not participate in the present payment. The Nigerian Electricity Supply Company has reported a moderate rise in profits and a dividend, as before, of 10 per cent. The £1 shares stand at 30s 9d to yield 6½ per cent.

Sterling Industries

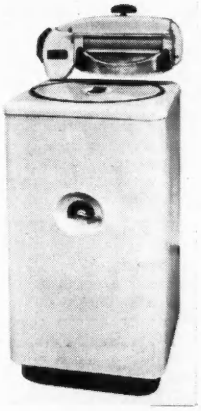
Sterling Industries, a company concerned with electrical and general engineering, reports a profit for the year to the end of last March of £84,000, an increase of £22,000 as compared with the previous twelve months. The net profit of £32,000 served to reduce the accumulated loss from £29,200 to £600. The group balance sheet contains a suspense deficit of just over £1 million and this, with the arrears of preference dividend, will have to be dealt with in the near future through the medium of a substantial cutting down of capital. The £1 preference shares stand at about 3s 9d, and the 5s ordinary at 3d. The last-named have had no dividend for thirteen years and the preference since June, 1938.

RECENT INTRODUCTIONS

NOTES ON NEW ELECTRICAL AND ALLIED PRODUCTS

Washing Machine

AN agitator type washing machine with a power wringer and pump is a new product of PARNALL (YATE), LTD., 43, Park Street, London, W.1. Just over 20in square by 36in high, it has a capacity of 5½ lb of dry clothes. The plastic agitator is controlled by a lever on the side of the cabinet, while the wringer, which can be latched in eight positions, has a quick-release mechanism designed for instant resetting without releasing the pressure. The pump will empty 7 gal in 80 sec. All mechanisms are sealed and self-lubricating.



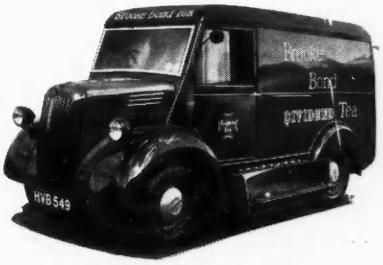
Parnall washing machine

Before stove-enamelling the cabinet is subjected to a phosphating process to prevent corrosion, all vulnerable parts being zinc sprayed. The bottom of the wringer storage compartment is dished and perforated to prevent water retention, and a full-length door is fitted at the rear. The tub and cabinet top are vitreous enamelled. The price is £39 10s (plus purchase tax in this country).

Battery Vehicle

Easier manœuvrability and absence of the "snatch" frequently encountered in electric vehicles are claimed by TROJAN, LTD., Croydon, to result from the use in its latest "Electrojan" battery electric vehicle of a two-speed and reverse gear box combined with a clutch. The two-speed gear also reduces the drain on the battery on hills.

With a 175 Ah 60 V battery the range is 25 miles. The standard van body provides for a 15 cwt payload and a capacity of 165 cu ft (including space at the side of the driver). The vehicle is claimed to climb a gradient of 1 in 7 with full load and to maintain a sustained maximum speed on the level of 18 m.p.h., at which speed it requires 5 h.p. The 60 V series-wound motor has a one-hour rating of 8 h.p.



"Electrojan" battery vehicle

"Bowstring" Pointer

When an indicating instrument has two or more scales difficulties are often encountered as a result of the inherent weakness

"Bowstring" pointer fitted to a Crompton moving coil multi-range voltmeter

of long, knife-edged pointers. To overcome this trouble CROMPTON PARKINSON, LTD., Crompton House, Aldwych, W.C.2, have produced a "Bowstring" pointer which is essentially a hairpin bow of aluminium alloy holding taut along its centre a fine wire forming the actual pointer. The metal used in the construction of this arrangement ensures that, even with wide variations in temperature the strung wire is always taut, and the method of securing the ends prevents any distortion of the bow.

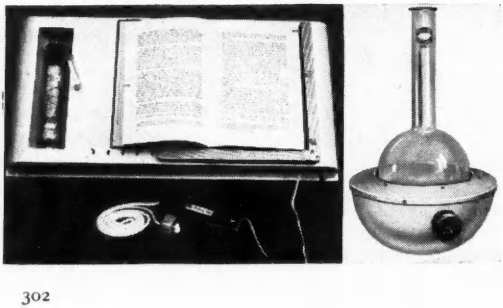
Tank Liquid-level Gauge

The Evershed precise tank gauge recently placed on the market by EVERSHED & VIGNOLES, LTD., Acton Lane Works, London, W.4, is a null point displacer system gauge for local and remote indication of liquid level in tanks. Its accuracy and advantages over float-controlled systems makes it suitable for use at oil refineries, chemical works and other industrial plant where exact indication of quantities is an important factor. The transmitter is, in effect, an automatic dip-stick installed on the top of the tank and readings are accurate to within 0.1 in, irrespective of range. Local indication is given and the reading is also transmitted to distant receivers which have double concentric dials normally marked in feet and inches. A feature of the system is that zero adjustment on the transmitter can be made without breaking the flameproof jointing.

Page Turning Machine

For the use of the paralysed the KIRDON ELECTRIC, LTD., 130, Vaughan Road, Harrow, has produced an electric page turning machine. The remote control switch, which can easily be strapped to the individual, requires only the slightest pressure to operate (4/1,000th ounce inches of energy). The machine is finished in cream stoved enamel and is fitted with an adjustable stand. The cost is 12gns.

Kirdon page-turning machine and (right) "Stabilag" heating jacket for laboratory flask



Pressure Control

Designed for industrial and commercial use, the latest "Teddington" pressure control, type QY, made by the BRITISH THERMOSTAT CO., LTD., Sunbury, Middlesex, replaces the older types PL and PH over which it is claimed to have numerous advantages.

This instrument is supplied with three standard adjustable ranges, between 28in Hg vac. and 250lb/sq in for low-, medium- and high-pressure duty. The range adjustment is outside the case, and inside are the calibrated range scale and a graduated differential adjustment. The switch is of the single-pole double-throw type, and can be used for making or breaking circuits on pressure change. As alternative pressure connections are available, the device is suitable for refrigeration or other installations, and the change-over function of its switch may be used for alarm purposes. The terminals are well spaced and labelled to facilitate wiring and an earthing connection is provided. Housed in a substantial metal case, the overall dimensions, including the range adjustment and pressure connection, are 5.75in by 3in by 2.25in, the weight being 1.25lb.

Lighting Fittings

The DEXRAY ENGINEERING CO., LTD., Brock Street, Lees Street, Manchester, 1, has added a new range of all-metal lighting fittings in bright chrome or bright copper to its standard range of crystal "Perspex" and chrome fittings. These fittings consist of mirror-flex centre columns or mirror-flex circular surrounds and a bright chrome or bright copper arrangement of arms.

Heating Jackets

An efficient and uniform means of heating laboratory glassware is provided by "Stabilag" jacketing which is available from ELECTRICALS, LTD., 14, Claremont Place, Newcastle-on-Tyne, 2. It is constructed from glass cloth to which is stitched a closely pitched resistance wire. The element lies between two further layers of glass cloth and each jacket is tailored to fit the vessel to be heated. All jacketing is normally supplied with an aluminium outer cover and is available with alternative types of control gear depending upon the degree of accuracy required.

ELECTRICITY SUPPLY

South Wales Development Policy

B.E.A. Rejects Farm Scheme

IN the two years ended 31st March last 33,220 new consumers of all types were connected to the South Wales Electricity Board's system and 533 miles of new power lines (including those in rural areas) were completed. During this period, capital expenditure on works directly connected with the distribution system amounted to over £3,000,000. There are now 459,175 consumers receiving supplies from the Board and a total of 6,652 miles of power lines throughout the Area.

The Board has made a survey of the whole of the undeveloped territory within its Area and has prepared a development scheme. This has been submitted to the South Wales Electricity Consultative Council, which has expressed the view that the scheme indicates the most logical and satisfactory method of dealing with the matter. The scheme provides for the erection of primary and secondary distribution lines so as to bring high-voltage supplies within a reasonable distance (say not more than 1½ miles) of all premises within the Area with the exception of those on mountainous ground or other difficult terrain. The work must, of course, be carried out within the limits permitted by Government policy, particularly in relation to capital expenditure, and the rate of progress must be regulated also by the need for financial stability of the Board's activities as a whole. Subject to these requirements, it is proposed to submit to the Consultative Council from time to time programmes setting out stages of development, based on a provisional order of priority.

Douglas Report

The borough electrical engineer and manager of the Douglas (I.O.M.) undertaking (Mr. C. Anderson) in his annual report for 1949-50, records a 6 per cent increase in electricity output. Sales totalled 29.7 million kWh, including 15.7 million supplied in bulk to the I.O.M. Electricity Board. Per head of the population electricity sales (excluding bulk supply and public lighting) averaged 545 kWh, and per consumer 1,747 kWh, the number of consumers at the end of the year being 7,797, an increase of 379. There was a net profit on the year's working of £8,552. Since 1946 the average price of fuel delivered at the power station has risen from £2 14s 3d to £3 5s 3d a ton. The first large change-over, involving 499 consumers, has been completed, and the progress of the scheme is being speeded up.

Farm Scheme "Impracticable"

Suggestions that diesel-driven electricity generating sets should be established at farms where no mains electricity supply is available have been turned down as impracticable by the British Electricity Authority. The proposal was made through the Northern Regional Board for Industry, but the B.E.A. said that in addition to its high cost, the scheme would divert capital expenditure from the more urgent work of rural electrification.

Guernsey Accounts

The accounts of the States of Guernsey Electricity Board for the year ended 31st December last show a total revenue of £123,480 and working expenses of £92,891. After meeting loan charges and allocations to reconstruction account £2,656 has been transferred to general reserve. Expenditure on capital account increased during the year from £455,642 to £555,057. The Board's engineer and manager is Major F. Barritt Hills.

Development in Madras

According to *Indian Trade and Industry*, the Chief Minister of Madras recently announced that the power production of the province will be doubled within the next three years by the addition of 200,000 kW from new schemes. He added that the Tungabhadea project would irrigate 300,000 acres of cotton country by 1954 and the Lower Bhavanir scheme about 200,000 acres of similar land.

North Wales Proposals

A party led by Mr. Robert Richards, chairman of the Welsh Parliamentary Party, and Lady Megan Lloyd George, recently toured Snowdonia in connection with the

hydro-electric proposals. It was stated that a Bill was unlikely to be submitted to Parliament this year. Mr. A. R. Cooper, controller of the B.E.A. Merseyside and North Wales Division, who accompanied the party, was asked to forecast how long it would take to supply electricity to rural West Wales if Parliamentary power was secured, and gave 1956 as the probable date. Referring to the Menai Straits scheme he said it looked good on paper but there were serious snags.

Eastern Area Progress

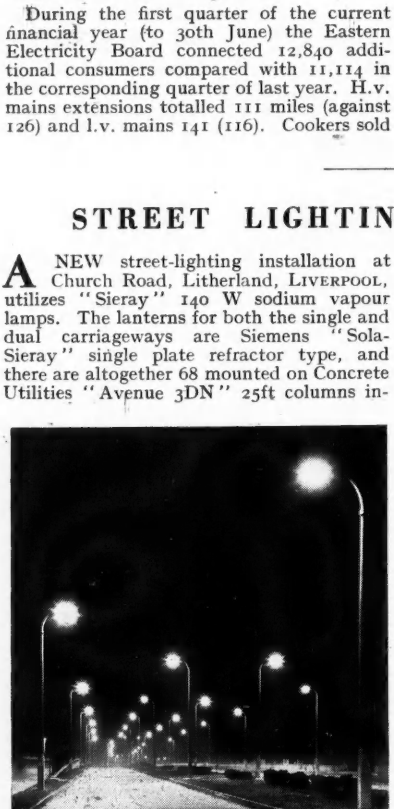
During the first quarter of the current financial year (to 30th June) the Eastern Electricity Board connected 12,840 additional consumers compared with 11,114 in the corresponding quarter of last year. H.v. mains extensions totalled 111 miles (against 126) and l.v. mains 141 (116). Cookers sold numbered 8,396 (7,672) and water heaters 2,368 (1,494), the total value of contracting work, sales of fittings and appliances, etc., being £1,019,382 (£790,548). During the quarter the Board purchased 957.6 million kWh (against 856.5 million).

Ayrshire Power Scheme

A scheme to reinforce the electricity supply system at Saltcoats, Ayrshire, at an estimated cost of £25,000 has been approved by the S.W. Scotland Electricity Board. It will take two years to complete. Besides improving the voltage in the area, the scheme will give supplies to certain new consumers who formerly were excluded because the network was overloaded. The voltage of the 3.3 kV network will be raised to 11 kV. Four of the existing substations will have to be rebuilt and a new substation erected.

STREET LIGHTING IMPROVEMENTS

A NEW street-lighting installation at Church Road, Litherland, LIVERPOOL, utilizes "Sieray" 140 W sodium vapour lamps. The lanterns for both the single and dual carriageways are Siemens "Sola-Sieray" single plate refractor type, and there are altogether 68 mounted on Concrete Utilities "Avenue 3DN" 25ft columns including one with a double-arm bracket. The average spacing is 120ft and the illumination per 100ft linear is approximately 5,500 lumens. All the lamps and control gear were supplied by Siemens Electric Lamps & Supplies, Ltd., and the erection was carried out by Erecon, Ltd.



Sodium lighting at Church Road, Litherland

EALING Borough Council is seeking approval to a proposal to convert the street lighting in certain main roads, including Gunnersbury Lane, Greenford Broadway, and part of Ruislip Road, from gas to electricity at a total cost of £4,000. There will be an annual saving to the Corporation of £825.

HOOLE U.D.C. has approved a recommendation that the gas lighting in Hoole Road should be replaced by sodium electric lighting at an estimated cost of £3,769.

It is proposed to install sodium lamps for main-road lighting at CHAPEL-EN-LE-FRITH.

Conversion from gas to electric street lighting in Ashton and Stockport Roads has been approved by DENTON U.D.C.

RAMSGATE Town Council has approved in principle a £44,000 scheme for lighting all roads in the district by electricity instead of by gas. It is hoped that the changeover will result in a saving of about £1,000 a year. The decision was taken after estimates from both electricity and gas undertakings had been considered.

Subject to Ministry approval, MACCLESFIELD Lighting Sub-Committee has accepted a tender of £9,500 for fluorescent lighting along the trunk road through the town.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (2s each) may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

1945

12568. Mitchell, J. H., and Burt, E. G. C.—Speed control of power plants. 17th June, 1946. (643441.)

1946

7180. Reichinstein, D.—Arc lamps and circuits therefor. 7th March, 1946. (Cognate application 7181, 12th September, 1945.) (643445.)

23158. Marconi's Wireless Telegraph Co., Ltd.—Processes for producing piezo-electric crystals. 2nd August, 1946. (643448.)

23684. General Electric Co., Ltd., Isaacs, G. G., and Nelson, E. H.—Electric metal vapour discharge lamps for polyphase circuits. 13th May, 1949. (643321.)

23791. Divall, R. W.—Electrically heated irons. 30th July, 1947. (643449.)

23882. Matériel Electrique S-W.—Excitation of variable potential generators by means of a series dynamo. 12th August, 1946. (643571.)

28820. Compagnie Générale d'Electricité.—Correcting arrangements for telegraphic systems utilizing a start-stop equal length code. 26th September, 1946. (643322.)

30967. Naamlooze Vennootschap Philips' Gloeilampenfabrieken.—Methods of manufacturing mouldings of synthetic resin material suitable for high-tension insulation. 17th October, 1946. (643453.)

33329. Haydon, H. W.—Apparatus for radiation or reception of radio waves, and the elimination of static and radiated electrical interference. 6th December, 1947. (643573.)

36753. British Thomson-Houston Co., Ltd., and Scott, W. J.—Glass-to-metal seals. 11th June, 1948. (643323.)

1947

98. Scott, H. H.—Apparatus or systems for transmitting electric signals. 1st January, 1947. (643574.)

4715. Greibach, E. H.—Electrical measuring instruments. 18th February, 1947. (643324.)

5909. Automatic Telephone & Electric Co., Ltd., and Baker, G. T.—Photographic recording apparatus. 8th November, 1947. (643515.)

7197. Kodak, Ltd.—Photo-electric exposure meters. 14th March, 1947. (Addition to 569614.) (643325.)

9416. Brady, J. B.—Communication systems. 9th April. 1947. (643327.)

12615. Svenska Aktiebolaget Gasaccumulator.—Microphones. 9th May, 1947. (643464.)

14227. Marconi's Wireless Telegraph Co., Ltd.—Antenna element. 28th May, 1947. (643577.)

16657. Metropolitan-Vickers Electrical Co., Ltd., and Hardie, A. M.—Thermionic valve gating circuits. 24th June, 1948. (643471.)

17719. British Thomson-Houston Co., Ltd.—Fuel distributing systems and fuel nozzles for use therein. 4th July, 1947. (643473.)

18311. Sunbeam Corporation.—Electric toaster. 10th July, 1947. (643578.)

18870. Centre National de la Recherche Scientifique. —Electrostatic generating machines. 15th July, 1947. (643579.)

19895. Zbrojovka Brno. Narodni Podnik.—Apparatus for electrolytic investigation of solutions. 24th July, 1947. (643336.)

20328. Commerce Pattern Foundry & Machine Co.—Electrically heated molten bath furnace. 28th July, 1947. (643478.)

20863. British Thomson-Houston Co., Ltd.—Dynamo-electric machines and systems and methods for making the same. 31st July, 1947. (643485.)

20695. Ritter Co., Inc.—X-ray apparatus. 30th July, 1947. (643483.)

20800. Westinghouse Electric International Co.—Gas turbine power plants. 31st July, 1947. (643484.)

21202. Philips Lamps, Ltd. — Electric discharge tubes. 5th August, 1947. (643487.)

22689. Standard Telephones & Cables, Ltd.—Terminal connector-socket. 15th August, 1947. (643343.)

22762. British Thomson-Houston Co., Ltd.—Electric induction apparatus. 15th August, 1947. (643490.)

23466. Hazeltine Corporation. — Super-regenerative wave-signal translating system. 25th August, 1947. (643347.)

27046. British Thomson-Houston Co., Ltd., and Choudhury, S-U. A. — Synchronous operation of dynamo-electric machines. 3rd September, 1948. (643360.)

27456. Electricity Meter Manufacturing Co. Pty., Ltd., and Lindley, A. B.—Evaporators of domestic type absorption refrigerators. 13th October, 1947. (643362.)

27520. Westinghouse Electric International Co.—Electrostatic dust precipitation. 14th October, 1947. (643363.)

28231. Wagstaff, P. A.—Means for automatically controlling the operation of electrical circuits. 15th September, 1948. (643366.)

29989. Elmes, D. H. — Delay-action devices for operating electric switches, fuel valves and other mechanisms after a pre-arranged time interval. 12th October, 1948. (643505.)

30369. Hart, G. W.—Radiolocation apparatus. 27th October, 1948. (643521.)

30539. British Thomson-Houston Co., Ltd.—Keying control systems for oscillators. 18th November, 1947. (643371.)

30707. British Thomson-Houston Co., Ltd.—Refrigerators. 19th November, 1947. (643373.)

32823. British Thomson-Houston Co., Ltd., and Gabor, D.—Electrical systems of communication. 11th January, 1949. (643378.)

33032. Bornstein, L.—Device for protecting three-phase motors against damage caused by failure of one phase or by heavily unbalanced loads. 15th December, 1947. (643522.)

33287. Standard Telephones & Cables, Ltd., and Bakker, W. K.—Electric harmonic generators. 10th December, 1948. (643523.)

33290. Standard Telephones & Cables, Ltd., d'Assis-Fonseca, H. M. M., and Ward, H. J.—Electric signalling systems. 10th December, 1948. (643524.)

33504. Airmec, Ltd., Gale, A. J., and Hooper, J. W. A.—Television and like receiving apparatus. 14th December, 1948. (643391.)

1948

531. Soc. Anon. de Commentry Four-Chambault & Decazeville. — Process for coating metal objects by electrophoresis. 7th January, 1948. (643534.)

728. Aktiebolaget HG Relay Patent.—Electromagnetically shiftable switch. 9th January, 1948. (643397.)

1273. English Electric Co., Ltd., and Asbury, A.—Control of dynamo-electric machines. 14th January, 1949. (643537.)

2894. Sangamo Weston, Ltd.—Electrical instruments with magnetic cores. 30th January, 1948. (643589.)

3255. Naamlooze Vennootschap Philips' Gloeilampenfabrieken.—Systems for generating voltage impulses. 4th February, 1948. (643541.)

4371. Attenborough, J. A., and Instone, L. R. T.—Electric system for use in detecting electric lamp failure in a circuit. 14th February, 1949. (643543.)

4608. Westinghouse Electric International Co.—Centrifugal fans. 17th February, 1948. (643404.)

4867. Philips Electrical, Ltd.—Machines for use in the manufacture of tubular incandescent lamps or discharge tubes. 19th February, 1948. (643405.)

5766. Guardian Electric Manufacturing Co.—Electric time delay devices. 26th February, 1948. (643597.)

6591. Compagnie Industrielle des Téléphones.—Devices for the transmission of electromagnetic waves by means of wave guides. 2nd March, 1948. (643601.)

7127. Claude-General Neon Lights, Ltd., and Higgins, C.—Electric circuit arrangements and fittings for high-tension electric-discharge lamps. 8th March, 1949. (643602.)

7826. Pressed Steel Co., Ltd., and Nolcken, W. G.—Refrigerating systems. 16th February, 1949. (643548.)

7939. Automatic Telephone & Electric Co., Ltd., and McMillan, J. — Non-linear resistance elements. 16th March, 1949. (643549.)

8033. Oldham & Son, Ltd., and Booth, F.—Manufacture of separators for electric accumulators. 7th March, 1949. (643603.)

8465. Telegraph Construction & Maintenance Co., Ltd., and Presswell, R. W.—Sealing devices for submarine electric cables. 9th March, 1949. (643550.)

8570. Metropolitan-Vickers Electric Co., Ltd., Hall, J. S., and Garland, J.—Glands for rotary machines. 24th February, 1949. (643604.)

8858. British Thomson-Houston Co., Ltd.—High-frequency dielectric heating. 25th March, 1948. (643605.)

9976. Lumalampan Aktiebolag., and Axbery, G. F.—Lamp holders for tubular electric lamps with axially projecting contact prongs. 9th April, 1948. (643609.)

10845. Joseph, Ltd., N. C., and Joseph, B. C.—Automatic cut-out switches for electric heaters. 18th May, 1949. (643420.)

11596. Standard Telephones & Cables, Ltd., and Eadon-Clarke, C. E.—High-frequency induction heating equipment. 22nd April, 1949. (643554.)

11955. Parker, A. L., Chapman, J. R., and Reed-Thomson, A. R.—Electrical press-button switches. 30th May, 1949. (643555.)

12253. General Electric Co., Ltd., and Bryer, R. F.—Apparatus for effecting the movement of couches, tables or the like, relative to their supporting member or members. 4th May, 1949. (643614.)

16709. Plessey Co., Ltd., and Webb, C. D. H.—Electric socket connections. 16th June, 1949. (643627.)

16872. Communications Patents, Ltd., and Exwood, M.—Electric circuit connectors. 22nd July, 1949. (643628.)

19173. Tricity Cookers, Ltd., and Greer, P. H.—Manufacture of cooking ovens. 13th July, 1949. (643560.)

19798. Belling & Lee, Ltd., and Haslam, A. G.—Electrical fuse holders. 16th March, 1949. (643561.)

20158. Expanded Metal Co., Ltd., and Knight, W. F.—Electrical resistances. 21st June, 1949. (643562.)

20242. Bremo, J. T.—Switch for the selective switching of tuning circuits in radio receivers. 29th July, 1948. (643634.)

20886. Ekco-Ensign Electric, Ltd., and Stickley, W. A.—Ballasts for use in the circuits of electric-discharge lamps. 5th August, 1949. (643637.)

21986. Hoover, Ltd.—Electric motors. 20th August, 1948. (643639.)

22288. Tinsley (Industrial Instruments), Ltd., and Steghart, F. L. F.—Electrically operated apparatus for controlling temperatures. 18th October, 1946. (Divided out of 624309.) (643428.)

24624. Sangamo Weston, Ltd., and Lovegrove, H. J.—Electrical measuring apparatus. 15th September, 1949. (643434.)

33176. Siemens Bros. & Co., Ltd., and Hender, L. F.—Electric contact springsets. 25th November, 1949. (643437.)

1949

13908. Tinsley (Industrial Instruments), Ltd., and Steghart, F. L. F.—Electrically operated apparatus for controlling temperatures. 18th October, 1946. (Divided out of 624309.) (643440.)

Amended Specification

575023. Callender's Cable & Construction Co., Ltd., and others.—Wave guides for high-frequency electric currents.

TRADE MARK APPLICATIONS

RECENT applications for the registration of trade marks include the following, objections against which may be entered within a month from 2nd August:—

CERAMICON. No. 670,306, Class 9. Ceramic electrical condensers.—Erie Resistor, Ltd., 2, Carlisle Road, The Hyde, Hendon, N.W.9.

TFC (design in ellipse). No. 678,418, Class 9. Electric current transformers, choke coils and convectors.—Transformer and Electrical Co., Ltd., Eastern Works, Eastern Road, Walthamstow, E.17.

PAGIVOLT. No. 685,622, Class 9. Mechanical and luminous display signs.—J. Love and T. Cowel, trading as Pagivolt Co., 203, Corkerhill Road, Glasgow, S.W.2.

ALWEX. No. 686,810, Class 9. Electrical apparatus included in Class 9.—Allen West & Co., Ltd., Lewes Road, Brighton, 7.

SILOLUXE. No. 687,460, Class 9. Electric vacuum cleaners.—C. C. A. (Vacuum Cleaners), Ltd., 109, South Street, Ponders End, Enfield, Mdx.

PYOD. No. 688,998, Class 9. Thermo-electric coupler for pyrometers.—Foxboro-Yoxall, Ltd., Lombard Road, Morden Road, Merton, London, S.W.19.

MACHLETT (design in ellipse). No. B681,872, Class 10. X-ray tubes and housings.—Machlett Laboratories, U.S.A. Address for service, c/o Cruickshank & Fairweather, 29, Southampton Buildings, Chancery Lane, London, W.C.2.

Design of letter "S" in circle. No. B682,934, Class 11. Electric handlamps intended primarily for garage inspection.—Wm. Sanders & Co. (Wednesbury), Ltd., Falcon Electrical Works, Riddings Lane, Wednesbury.

HOTPOINT. No. 687,763, Class 20. Shaving mirrors, mirrors for handbags, mirrors for use in applying theatrical make-up, and cabinets incorporating ironing boards.—Hotpoint Electric Appliance Co., Ltd., Crown House, Aldwych, London, W.C.2.

Electrical Housecraft Advisers

IN furtherance of its aim to provide means of exchanging ideas and experience between its members, the Association of Electrical Housecraft Advisers is producing a periodical bulletin. The first issue contains a message from the Association's president, Dame Caroline Haslett, and a foreword by the chairman, Miss M. G. Gosse. Most of the matter comprises notes on the activities of members written in a very racy style.

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

CONTRACTS OPEN

Where "Contracts Open" are advertised in our "Official Notices" section, the date of the issue is given in parentheses.

Australia.—QUEENSLAND.—26th October. City Electric Light Co., Ltd., Brisbane. Station batteries, battery chargers and associated switchgear for Bulimba "B" power station. (C.R.E. (I.B.) 60709/50. Ten/1503.)*

Charlesworth (nr. Manchester).—30th August. Electric heating installation at St. John's Church. (See this issue.)

Cleethorpes.—6th September. Corporation. Electrical installations in 100 dwellings on Highgate housing site. (See this issue.)

Denbighshire.—Education Authority. Electric lighting installation at Llanrwst Grammar School canteen, kitchen and dining room. (See this issue.)

India.—NEW DELHI.—25th September. Directorate-General of Industries and Supplies. Fifty-two diesel-engine driven alternators, ranging from 62.5 to 625 kVA. (C.R.E. (I.B.) 61259/50. Ten/1518.)*

BOMBAY.—25th September. Electricity Department, Government of Madhya Pradesh. Equipment for 66 kV substations. (C.R.E. (I.B.) 61357/50. Ten/1517.)*

London.—18th October. Metropolitan Water Board. Two sets of electrically driven well and surface pumps for Chingford pumping station. (See 11th August issue.)

Newcastle-upon-Tyne. — 16th September. Education Committee. Installation of electric lighting at Benton Park Primary School. (See this issue.)

New Zealand.—AUCKLAND.—28th August. Auckland Electric Power Board. 250,000 yards of weatherproof braided aerial cable. (C.R.E. (I.B.) 61801/50. Ten/1515.)*

Norwich.—15th September. Water Department. Two electrically driven pumping sets. S. N. Kelly, engineer and manager, City Hall.

Pakistan.—KARACHI.—24th August. Director-General of Supply and Development. Conduit pipes and fittings. (C.R.E. (I.B.) 60990/50. Ten/1506.)*

Southern Rhodesia.—SALISBURY.—1st December. Electricity Supply Commission. One 20,000 kW high-pressure steam turbo-alternator, with auxiliaries and accessories, for Umniati "B" power station. (C.R.E. (I.B.) 60908/50. Ten/1504.)*

Tangier.—3rd October. Director of State Water and Electricity Services. Two diesel-driven 2,500 kW sets. (C.R.E. (I.B.) 60486/50. Ten/501.)*

*Specifications may be inspected at the Commercial Relations and Exports Department, Board of Trade, Thames House North, Millbank, S.W.1 (Victoria 9040).

Wellington (Salop).—4th September. U.D.C. Installation of electric lighting to the Baths Hall, off Walker Street. Surveyor, 14, Walker Street.

ORDERS PLACED

Durham.—County Council. Electrical work at "Seaton Holme" Hostel, Easington (£388) —East Durham Electricals, Ltd., Shotton.

Middlesbrough.—Town Council. Electrical installation in connection with alterations at Nunthorpe Hall, Middlesbrough (£851).—Tees Electrical Installation Co., Thornaby-on-Tees.

Sheffield.—Corporation Housing Committee. Electrical installations in 198 houses on the Parson Cross estate (£3,538).—M. B. Munks.

South Shields.—Town Council. Re-wiring Dean Road County Secondary School, South Shields (£1,830).—A. Robertson, Ltd.

Stockport.—Electrical installation at Banks Lane primary school (£6,237).—Piggott & Whitefield, Ltd.

Tynemouth.—Education Committee. Electric lighting equipment for new Collingwood junior mixed and infants' school (£6,022).—Electric Equipment, Ltd., North Shields.

Town Council. Electrical installations in 36 houses on Marden South site (£926).—Whitfield & Co., Whitley Bay.

Wakefield.—Corporation Education Committee. Installations of electric lighting, power and clocks at Flanshaw County Junior School and Broadway County Infants' School. (£1,997 and £1,509 respectively).—H. Smith, Wakefield.

CONTRACTS IN PROSPECT

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Bootle.—Factory for National Cork Industries, Ltd.; Hawthorne Building & Construction Co., Ltd., Vulcan Street, Liverpool.

Bournemouth.—Police headquarters, Madeira Road, and secondary modern school, West Howe; borough architect.

Bradford.—Adaptations, etc., St. George's Hall (£62,784); W. H. Leatham, town clerk.

Cambridge.—Flats (56), Newmarket Road West; borough surveyor, Guildhall.

Clitheroe.—County school, Edisford Road (£55,000); Lancs county architect, Preston.

Coventry.—Factory, Stoneleigh industrial estate; King's Engineering Co., Ltd., 47, Rochester Road.

Dumbarton.—School (£67,000); Wylie, Shanks & Wylie, architects, 120, Blythswood Street, Glasgow.

Durham.—County school at Newton Aycliffe; Grenfell Baines Group, quantity surveyors, Simpasture, Aycliff. School at Penshaw; J. G. Cowe & Son, architects, Central Chambers, Chester-le-Street.

Eastbourne.—Factory, Brampton Road; Wm. Harden, Ltd., 38, Grove Road.

Epsom.—Out-patients' and X-ray departments at hospital; G. Jeeves, architect, 61, Catherine Place, S.W.1.

Glasgow.—Houses (670), Milton, fourth development; Scottish Housing Group, 21, Blythswood Square.

Hamilton (Lanarkshire).—Reconstruction of garage, workshops and offices, Bothwell Road (£45,000); Central S.M.T. Co., Ltd., Traction House, Motherwell.

Hexham.—X-ray department, chest clinic and dispensary at Hexham Hospital for the Regional Hospital Board; Allen & Hill, quantity surveyors, Tankerville Terrace, Jesmond, Newcastle-on-Tyne.

Hull.—Factory, Scarborough Road; Jones Beverage Supply Co. (Hull), Ltd., 495, Hessle Road.

New police headquarters, Queen's Gardens (£400,000); A. Rankine, city architect.

Ilford.—Fire station, New North Road, Hainault; county architect, Chelmsford.

Ipswich.—New workshops for Central College; Johns & Slater, architects, 32, Foundation Street.

Keighley.—Junior school at Bracken Bank; borough architect.

Kent.—Technical and art colleges, Bromley, first section (£250,000), and college at Dartford; county architect, Maidstone.

Leek.—Houses (24), Leek Haregate estate; U.D.C. surveyor.

Leicestershire.—Schools at Wigston Magna, Ashby-de-la-Zouch, and Whitwick; county architect, Leicester.

Letchworth.—Houses (41), Grange estate, for U.D.C.; surveyor, The Council House, Broadway.

Liverpool.—Houses at Croxteth estate (589) and at Speke (477); Unit Construction Co., Ltd., Knutsford, Cheshire.

Flats (60), Evelyn Street; J. R. Barton & Sons, Ltd., Liverpool Road, Ainsdale.

Factory, Speke Boulevard; Automotive Products Associated, Ltd., Brock House, Langham Street, W.1.

Loddon.—Secondary school and houses for teachers and caretaker; A. F. Scott & Son, architects, 23, Tombland, Norwich.

London.—CHELSEA.—Flats (24), Hortensia Road; borough engineer.

POPLAR.—Hostel for aged persons (£47,970), Grundy Street, for L.C.C.; C. Miskin & Son, Ltd., builders, Romeland, St. Albans.

SYDENHAM.—Works extensions; Butler-Jones, Ltd., Kangley Bronze Works, Kangley Bridge Road, S.E.26.

Longeaton.—Houses (37), Wilsthorpe Road, for U.D.C.; A. H. Taylor (Notts), Ltd., 151, Attenborough Lane, Attenborough, Notts.

Newcastle-on-Tyne.—New Ravenswood Road county primary school (work to start this year); G. H. Gray, architect, Camden Street, North Shields.

Newton Aycliffe.—Houses (90), Clarence Farm site, for Aycliffe Development Corporation; Grenfell Baines Group, architects, Simpasture, Newton Aycliffe.

Northampton.—School, Queen Eleanor Road, Far Cotton; H. A. Skerrett, chief education officer, Springfield, Cliftonville, Northampton.

Northumberland.—Erection of farm steading at Kirkley Hall Farm Institute for the C.C. (£27,000); G. Bainbridge, builder, 205, Westgate Road, Newcastle-on-Tyne.

Penrith.—Houses (44), Scaws estate and Hutton Hill; R. E. Reay, Southend Road, Penrith.

Peterborough.—Shops, flats, and branch library at Dogsthorpe Newark estate (£48,570); H. J. Firman, Peterborough.

Plymouth.—Five studios for school of architecture and new department for weaving, Palace Court School; Louis de Soissons & Partners, architects, 11, The Crescent, Plymouth.

Radcliffe.—Houses (60), bungalows, and maisonettes, Wordsworth Avenue site; borough surveyor.

Southend-on-Sea.—Office building, Victoria Avenue, for National Assistance Board; A. D. Jackson & Son, Ltd., builders, Bournemouth Park Road.

South Shields.—Factory addition, Templetown, for Ford & Co.; J. S. Hubbard, architect, 43, King Street.

Factory for Eskimo Slippers, Ltd., South Taylor Street.

Three-storey block of flats, Prince Edward Road; borough engineer.

Tynemouth. — Factory addition, Tudor Avenue, for Stella Building Products, Ltd.; W. Stockdale, architect, Howard Street, North Shields.

Fish oil factory, Union Road, for R. Irvin & Sons, Ltd.; Tasker & Child, architects, Trinity Buildings, 25, New Bridge Street, Newcastle-on-Tyne.

Wellingborough.—Complete health centre, Oxford Street (£50,000); county architect, Guildhall Road, Northampton.

Worcester.—Nunnery Farm secondary school; E. B. Musman, architect, 12, Upper Berkeley Street, London, W.1.

Students' Scottish Meeting

APPROXIMATELY fifty members of the Students' Sections of the Institution of Electrical Engineers have been taking part in a summer meeting in Scotland this week (14th to 18th August). This is the first occasion since the war that a summer meeting has been arranged in Scotland for members of Students' Sections. The programme has included the following visits: Portobello and Braehead power stations; Loch Sloy scheme; Scottish Industrial Estates; Babcock & Wilcox, Ltd.; John Brown & Co., Ltd.; Bruce Peebles & Co., Ltd.; Ferranti, Ltd.; and Scottish Cables, Ltd. Hospitality has been provided by the Scottish Centre of the Institution and the various firms and authorities visited.